









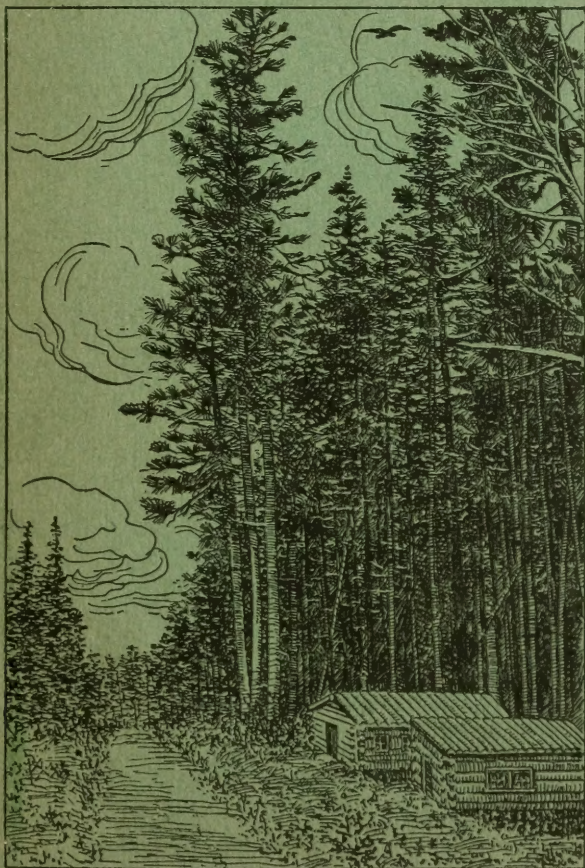




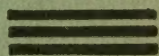




# CANADIAN FORESTRY JOURNAL.



**JANUARY  
1905**



**PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.**





# Canadian Forestry Association.

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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary,

**R. H. CAMPBELL,**

OTTAWA, ONT.

*Department of the Interior.*





A LOGGING ROAD IN ONTARIO.

*Frontispiece.*







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# Canadian Forestry Journal.

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VOL. I.

JANUARY, 1905.

No. 1.

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## THE CANADIAN FORESTRY ASSOCIATION.

*By the Editor.*

The Canadian Forestry Association presents to its members and the public the first number of the Canadian Forestry Journal, which will be devoted to the interests of the Association and the advancement of the forestry movement generally. It has been felt for some time that a distinctive medium representing the Association was imperatively required if it was to bring its objects and work to the attention of the public in an adequate manner, and enlist popular sympathy and support. In pursuance of this object a decision was reached at the annual meeting that such a publication should be undertaken, and in fulfilment of that resolution the publishing committee now submit the first number.

As this marks an important step in the history of the Association, it may be well to take the opportunity of presenting a brief sketch of its development and the purposes of its organization. The project for the formation of the Canadian Forestry Association was initiated by Mr. E. Stewart, Dominion Superintendent of Forestry, who called a meeting of a number of persons interested in the subject at his office, on the 15th February, 1900. At that meeting it was decided to form such an Association, and on the 8th March following the first annual meeting was held in the City of Ottawa, at which the Canadian Forestry Association was duly organized, with the following staff of officers:—Honorary President, His Excellency the Governor-General; President, Hon. Sir Henri Joly de Lotbinière; Vice-President, Wm. Little; Secretary, E. Stewart; Assistant Secretary and Treasurer, R. H. Campbell; Board of Directors: Hiram Robinson, Thos. Southworth, Professor John Macoun, Dr. Wm. Saunders, Hon. G. W. Allan, E. W. Rathbun.

The considerations that determined the promoters of the movement to take such a step deserve recapitulation.

Canada has from the beginning of her history been noted for the extent and riches of her forests, and the lumber industry has been one of the leading branches of her manifold activities and has developed with her growth, forming a principal contributor to the domestic and export trade of the country, giving employment to a large section of the population, developing a healthy and sturdy class of men, and adding to the wealth and prosperity of the Dominion. At the same time the revenue received by some of the provincial governments directly from the forest has been one of the largest sources of income, and has rendered a resort to direct taxation in any other form almost altogether unnecessary. The export of domestic forest products for the last fiscal year was \$36,724,445. In Ontario and Quebec the usual revenue from woods and forests is from a million and a quarter to a million and a half dollars each year, and in the other provinces which control their own timber lands the revenue is steadily on the increase. In New Brunswick, during 1903, it was \$196,500. In British Columbia the revenue for the present year was estimated at \$250,000, and it will probably be much larger. The total value of forest products, as stated by the Census of 1901, is for the census year, \$51,000,000.

European students of forestry, who have been forced by the condition of affairs on that continent to give the wood supply careful thought, have sounded a note of alarm as to the future. We quote from M. Mélard, one of the leading foresters of France:

"At the present moment the forestry situation in the world can be summed up in these words:

*"The consumption of wood is greater than the normal production of the accessible forests; there is in this production a deficit which is for the moment supplied by the destruction of the forests."*

"This situation is very grave. It merits the attention not only of foresters by profession, but of economists and statesmen. Forestry questions which to-day encounter so much indifference, are destined to take, before many years, a capital importance in the consideration of civilized people. May it not then be too late!

"It is profoundly disquieting to ascertain that 215 million inhabitants of Europe, constituting the nations where commerce and industry have attained the greatest power, do not find enough of wood in the forests of the territories which they occupy.

"If Sweden, Finland, and Canada should supply alone the importations of all the countries requiring manufacturing wood, their normal production would not suffice, and their forest capital would be promptly dissipated."

Dr. Schlich, a leading English authority, discussing the same question, and reaching a somewhat similar result, concludes with the following statement:



"The great standby for coniferous timber will be Canada, if the Government does not lose time in introducing a rational management of her forests."

What is the actual forest situation in Canada to-day? Originally covered by an immense forest, stretching from the Atlantic to the Pacific, unbroken save where the prairie fire and the buffalo had won for themselves a place on the plains of the West, the axe and fire and the advance of settlement have so changed the face of nature that the hardwood forests have practically disappeared, and with the exception of birch and, to a less extent, maple, Canada is dependent almost wholly on outside sources for her hardwood supply. Those who have had opportunity of observation state that not more than one-third of her coniferous forests are mature timber, the remainder being *brulé* or small trees. In many districts fire has done its work by itself or as an accessory to the axe, with such destructive effect that large tracts, once forest-clad, are now bared to the rock or sand foundation upon which so much of the coniferous forest stands, and left useless and unproductive, efforts to convert them to agricultural purposes having proved utterly futile.

Flowing from the great forest-clad hills and mountains of the Dominion are numerous perennial streams which in their descent form water-powers of immense possibilities and value, and furnish supplies of moisture to the plains beneath, plains which, in some cases, in order to their successful cultivation, require a substantial addition to the scanty rainfall which they receive. The possibilities of electrical development and other uses of the energy furnished by these streams open immeasurable limits to Canada's industrial future. And the even flow, and in some situations, the very existence of such watercourses depends on the preservation of the forests at their sources. In Southern France, at the beginning of the last century, the slopes of the Pyrenees, the Cevennes, the Alps, were deforested and left bare to the action of the elements. The results were the transformation of even-flowing streams into rushing torrents, the erosion of the slopes into gullies and ridges, destructive land-slides, and the deposit of silt on the plains beneath to such an extent that some 8,000,000 acres of once fertile soil in twenty departments were involved in the disastrous consequences of forest destruction on 1,000,000 acres of mountain slopes. France has already spent \$20,000,000 to help repair this condition and replace the forests, and it is estimated that more than \$30,000,000 will have to be expended before the area which the State possesses, only some 800,000 acres, will be restored. Canada has no special dispensation from Providence, and a similar transgression of the laws of nature will inevitably bring the same results. Is there not, therefore, reason that this question should

be given the most careful consideration by all seriously interested in the future of the country?

In the older districts too severe denudation has already resulted in dangerous freshets in the spring time, and the failure of springs and streams in the summer, when their need is most felt, losses from violent windstorms have increased, and the supply of wood for fuel and domestic purposes is diminishing so rapidly that it will soon become altogether inadequate, if some measures are not taken to ensure renewal. The condition that is thus being brought about by artificial means exists naturally in the prairie districts. Here the need of wood for fuel and shelter is felt from the beginning. The direct bearing which the shelter afforded by a strip of timber has on agricultural production is clearly shown by the comparative results on sheltered and unsheltered plots recorded in 1900 at the Indian Head Experimental Farm, where the shelter meant a doubling or trebling of the yield, while on some exposed places the crops were a complete failure.

The esthetic value of trees has an influence on one side of life which it is well that Canadians should not neglect. The beautifying of the home, the embellishment of the city street, the ornamentation of the park and roadside, with the graceful forms, the beautiful foliage and the grateful shade of forest trees, brings to each of these a charm and attractiveness which cannot but have an elevating effect on the national life by awakening the sense of beauty and attaching the affections of the people more strongly to the homes and haunts of their native land.

In laying down the programme of its principles, the Canadian Forestry Association kept all these questions in view. In brief, the statement of its objects is: To advocate and encourage judicious methods in dealing with our forests and woodlands; to awaken public interest to the deteriorating effects of wholesale destruction of forests; to consider and recommend the exploration, as far as practicable, of the public domain, and its division into agricultural, timber and mineral lands, with a view to devoting the public lands to the purposes for which they are best fitted; to encourage reforestation and the planting of trees on the prairies, in cities, towns and villages, and throughout the country; to collect and disseminate for the benefit of the public, reports and information bearing on the forestry problem in general.

The Forestry Association, although it is consolidating the influence of those favoring better forest management, is not the pioneer in this movement. Such a movement has been supported and advocated for many years by earnest and far-seeing citizens of the Dominion, most of whom have now identified themselves with the Association. By writings, by ad-



addresses, by petitions to the Government, they sought to bring the matter to the attention of the public, but the time was not ripe, and the public indifference did not readily yield. "The forests of Canada are inexhaustible" was the stock argument. "Forestry is a fad" was the general opinion. And if any interest was aroused, it was quickly lulled again by the absence of that pressure of necessity which is the greatest incentive to action. "The future may be allowed to look after itself."

Progress was, however, being made. A great forestry convention was held in Montreal in 1882, at which the American Forest Congress was organized. This conference was attended by large numbers from Canada and the United States, and the papers and discussions aroused much attention at the time, and while the effects were to a large extent ephemeral, still from that time may be dated the first effective efforts to deal with forest fires, and to make permanent reservations of timber lands, and these are the two special directions in which Canadian forest policy has made the greatest development.

Fire is the most serious menace to the forest, and protection from it must be at the basis of any system established. At first consideration it might seem preposterous that the vast extent of the Canadian forest could be effectively protected from fire, but when it is reflected that the fires that result from natural causes are comparatively few in number compared with those that originate through the action of man, the matter does not seem to be an utter impossibility. And that it is not so experience has already shown. The Dominion and Provincial Governments, with the exception of British Columbia and Prince Edward Island, have established special fire-ranging services, commencing with that of Ontario in 1885, and these have been effective in proportion to the thoroughness with which they have been worked out. The more that has been spent on the service the greater has been its effectiveness, and the results have been the saving of much valuable timber. The smoke from forest fires which was at one time the usual accompaniment of every summer in the cities of Eastern Canada has given place to almost complete immunity from such an unpleasant state of the atmosphere. A great deal still remains to be done in extending the system and perfecting its operations, but the principle of a fire ranging staff is justified beyond the possibility of hostile criticism. The fire-ranging system is an established and unassailable feature of Canadian forest policy. It is a form of fire insurance for the forest which is both cheap and effective. In the Province of Ontario, which spends the largest amount upon this service, the expenditure was \$31,237 in 1903, and the revenue received from woods and forests was \$2,307,356. Although this revenue was swollen beyond the usual proportions by bonuses

for timber limits, it may be pointed out that the large bonuses tendered were justified on the part of the purchasers largely by the immunity from fire ensured by the fire preventive service.

Timber reserves have also been established in different parts of the Dominion, partly with the object of protecting the game animals and the watersheds, but also with the purpose of providing a permanent supply of timber. These reserves, so far as they extend, and they now comprise an area of over eighteen million acres, are a concrete exemplification of the principle that lands which are unfitted for other purposes should be devoted to the growth of timber. This is a principle of first importance, for, as the forests require but little from the soil, they already exist, and can be reproduced on lands so rocky or sandy that nothing else of value can grow upon them. In every part of Canada, and particularly along the great Laurentian ridge, and in the mountainous districts, there are large areas bearing magnificent forests, which, bared of such covering, have no other productivity to take its place. The extent of such areas in Canada constitutes an imperative demand that the forest should be continued and reproduced.

The necessity for tree growth on the western plains was early recognized, and an effort to stimulate action in this direction was made by the adoption of the Tree Culture Claim Act, under which the holder of entry for a quarter section of land might earn title thereto by planting forty acres with forest trees. Lack of knowledge of the requisites of success resulted in almost total failure of this plan of reforesting the plains. When the Experimental Farms were established in the West in 1889, experiments in tree growing were immediately begun, and have resulted in a clearer understanding of the conditions of success and of the species which give the most satisfactory results. With the inauguration of the Dominion Forestry Branch in 1899, a still further impetus was given. A scheme for supplying the settlers with trees, to be planted and cared for under expert advice, has been worked out successfully, and gives promise of great future development.

This was the course of development the forestry policy of Canada had followed when the Canadian Forestry Association came into existence. Since that time the fire protective force has been increased, and the methods of management improved throughout the Dominion, and such a force has been established in some places where previously no effort of the kind had been made. The Forest Reserves have been enlarged and the number increased. In Ontario a plan for assisting the farming population to set out wood lots has been arranged through the medium of the Agricultural College. While the Forestry Association cannot assume all the credit for these advances, it can at least claim

that all efforts in that direction have had its support, and that it has had sufficient effect on public opinion to assist materially in making the way for such development easier. Annual meetings of the Association have been held each year, and reports of the proceedings have been published and widely distributed. The Association has, by resolution, made representations on forestry questions to different governments and other public bodies, all of which have received respectful consideration, and have had an influence on the course of forest legislation. By the editing of a forestry department in *Rod and Gun in Canada*, by public meetings and through the press, the purposes of the Association have been kept before its members and the public, and it is hoped to do this more completely through the columns of the present journal.

The Canadian Forestry Association, at the end of the fourth year of its existence, has a membership numbering nearly six hundred, including legislators, foresters, lumbermen, farmers, scientific men, and others. Its financial position is good, and in addition to the publication of the Forestry Journal, several advance steps are now under contemplation, with the object of reaching and arousing public interest more fully.

What are the possibilities of the future? In regard to this we may learn much from others.

Germany has for centuries been working out a forest administration, which from crude beginnings has developed into a highly specialized system, in which the annual returns from the forest have steadily increased both in quantity and value, although for the most part such forests are situated on poor, sandy soil, or in rough, hilly or mountainous districts. With a population of 240 persons to the square mile, Germany considers it profitable to not only keep her poor lands, at present forested, in that condition, but to increase the area of such forest lands, even by purchase. The net annual income from her 35,000,000 acres of forest land is \$63,000,000.

In France a similar policy has been followed, and although the recklessness of the Revolution period interfered with its steady advancement, since 1870 no forest lands belonging to the State have been alienated, but instead the area has been increased from year to year, and improved methods of management are being developed.

Canada's system of forest administration cannot, however, be wholly the same as that of any other country, and must start on a simple basis.

Its foundation has been laid in the policy, almost universal in Canada, of keeping the forest lands under Government control, in the fire-ranging system, and in the setting apart of forest



reserves. The reserves give an opportunity for a more careful and minute study of forest conditions than is possible in the great area of the general forest, and are the first steps toward the final conquering of much that has become a wilderness, but which may yet blossom, if not as a rose, at least with a beauty and verdure and value of its own. The aim of the management must be to produce a forest of well-formed trunks, clear and clean, and the evolution of the forest by which this is reached is a question requiring careful study. Various influences affect the results beneficially or otherwise. Different species of trees have varying effects on one another. Some will grow in dense shade; some require light. For some a great deal of moisture is necessary; others prefer dry locations. Insects do their destructive work, as for instance the larch sawfly, which killed the tamarac throughout the northern forests; rot and fungi and storms all have their effect.

The problems of economy, of engineering, of transportation, of management, of scientific investigation, that a study of forest administration opens up will give scope for the best intellect that Canada can produce, and displays a field for investigation, fascinating in itself and in its possibilities of practical application for the good of the country.

The educational institutions have recognized the meaning this movement has for them, and have been turning their attention to the possibility of providing the scientific training that may be necessary. Sackville University has had a course of lectures on Forestry. Queen's University, during the term of 1900, also held a similar series, and both she and the University of Toronto have been looking towards the establishment of a School of Forestry. The Ontario Agricultural College is taking active steps in its special sphere.

The forestry movement should appeal to all Canadians. Canada has been blessed by Providence with a wealth of forest. It has inwoven itself in her poetry and her history. It clothes with beauty her sterile lands, making them productive and giving healthy occupation to a happy people. In the advance of the civilization of the nineteenth century two-thirds of this forest has been swept away by fire, uselessly and needlessly. Rocky and sandy wastes have been bared and left desolate. Is this all that the intelligence of man can do? Has the twentieth century no other purpose to accomplish? Will the close of another cycle find the destruction much more surely and completely established? Or will the expiration of another hundred years find the forests clothing the rocky hills and valleys with their beautiful verdure, well-ordered, productive, abounding in wealth for the state, furnishing the needs of Canada and the regions beyond, supporting a hardy and intelligent populace, form-

ing a shelter for the wild animals and a place of pleasant resort for the people. The accomplishment of such a purpose is well worthy the support of all patriotic citizens, of all who love their native land, and have an interest in its future. Such is the purpose which the Canadian Forestry Association has set before it as the ideal for Canada, to which it proposes to work, and for which it appeals for support.

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A request was made recently to the Bureau of Forestry for the Province of Ontario for a forester to assist in the management of timber limits in Algoma, to which the only reply that could be sent was, that there was no supply to meet the demand. Such a request, however, emphasizes the fact that the need of trained foresters is beginning to be felt.

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At a recent meeting of the Board of Directors of the Canadian Forestry Association, a resolution was passed expressing the opinion of the Board that in view of the annual destruction of timber in British Columbia, and the difficulty of guarding the forests from fire, it is desirable that the Bush Fires Act of that province should be amended so as to prohibit the starting of fires for the clearing of land between the first day of May and the first day of November in each year, unless a special permit for that purpose is granted by the Forest Ranger, or other officer appointed for the district in which such permission is asked.

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A great deal of interest has been excited in the County of Renfrew, in Ontario, by the preparations being made for the erection of what is popularly known as a "stump factory." The object of the establishment is to utilize the red pine stumps in that district by reducing them by the action of heat in a retort, and it is expected that the chemical products and charcoal will return a good profit. Similar establishments have been in operation in Michigan for some time with satisfactory results. The farmers in the vicinity of the proposed location have great expectations of having lands cleared at a profit, thus accomplishing two purposes, as the result will be a considerable increase in the agricultural value of the lands.

## CANADA AS A FIELD FOR INTELLIGENT FORESTRY.

*E. Stewart, Dominion Superintendent of Forestry.*

The production and proper utilization of the unoccupied forests of Canada is a matter that demands the serious consideration of the Canadian people. Very few countries possess so large an area of forest lands as Canada, and while a part of this is fit for and will be brought under cultivation for the growth of agricultural products in the future, a large proportion is unfit for this purpose, and can be more profitably left for the production of timber and to protect the game, which is also an important product of our northern regions.

Before, however, dealing with these unoccupied forests of the north, let us consider for a moment the uncleared lands of the older provinces granted by the Crown for agricultural purposes, and also those under license as timber limits.

According to the census of 1901, 34% of the total area of the farms of the five eastern provinces is still in forest. If this quantity of woodland were uniformly distributed throughout all parts of these provinces, the most exacting economic forestal demands would be met, but this is very far from being the case. In the older settlements in most cases very little woodland is left, the high average percentage being made up by the newer districts, but here too the axe and the forest fires are busy in bringing about similar conditions to those now prevailing in the old frontier countries, in some of which the country is almost denuded, and resembles in bleakness our western plains. It is a well understood fact that a certain proportion of the area of any district should be left in forest. This may vary from, say, 10% to 30%. There are some districts in the older provinces where there is not 5% left, and the result is to be seen in the disastrous spring floods followed later on in the season by droughts, where in former years, before the country was cleared up, neither the one nor the other was ever experienced. This state of affairs is becoming so common in many parts that it is high time that the municipalities should take action to encourage the farmers to leave a portion of their farms in forest by reducing or freeing such wooded areas from taxation or by other means to this end. But the farmer himself will not only be doing good to the community at large, but also best serving his own interests by allowing a certain portion of his farm to remain in forest as a wood-lot. Space will not permit me to deal with the farmer's wood-lot further than to say that there are very few farms which have not a certain percentage of land that is better adapted, and can be more pro-



fitably used, for that purpose than for the growth of agricultural products.

Our people too frequently fail to realize the elements of reproduction and growth that are constantly going on in the forest; that though they do not require to sow, yet there is a proper time to harvest a wood crop, and that a little care in the protection of the young trees from destruction by stock or otherwise will be amply rewarded by the young trees which should take the place of those that have reached maturity, and which the owner has removed. There is another fact regarding trees in which they differ from agricultural products, and it is this: no rotation of the forest crop is necessary. The same varieties can be grown on the same soil for an indefinite period.

A considerable percentage of our forest land lying immediately north of the present settled districts in Ontario and Quebec, but not extending beyond the northern watershed of the St. Lawrence is held under license by lumbermen and capitalists. These licensees have only the right to cut the timber of certain varieties on their limits. In former years the bush operations of the lumbermen were invariably followed a year or two after by a forest fire, that not only burnt up the dry brush that he had left on the ground, but also destroyed all the remaining standing timber, and not only that, but more frequently than otherwise the fire did not confine itself to the area cut over, but spread to other parts and often destroyed large adjoining areas of good timber. It is gratifying to know that great improvement in this respect has taken place within the past few years, and that the destruction in those districts by forest fires has greatly decreased, owing to the greater care exercised in the use of fire, and by a patrol system which cannot be too highly commended.

Another step in advance, however, is necessary, and that is with reference to the proper harvesting of the timber crop so that the same limit may continue through the increment of growth to furnish a timber crop in perpetuity. Here is a great field for intelligent work. The time has now arrived when the timber on those limits has reached such a value that no holder can afford to disregard the extensive young growth of pine not yet large enough for saw logs with which every limit abounds, and which if protected will more than repay a good rate of interest on any care that may be necessary to protect it. There is a great opportunity here for the intelligent forester. Not only is it necessary to protect the limit from fire; to cut only trees that have arrived at a state of maturity, but also to remove the useless or inferior varieties in order that the more valuable may have room to grow and that the area may be utilized to the best possible advantage.

Let us now consider the conditions of that vast stretch of unoccupied forest country lying north of what has been referred

to. It extends in an east and west direction, from ocean to ocean, a distance of about three thousand miles in length, with an average breadth of probably about five hundred miles, between the arable land on the south and the barren lands of the far north. Is there anything in connection with this great region demanding our attention? To this or almost any question regarding it an answer is difficult to give, for the reason that we know so little about it, but this very ignorance suggests one thing that should be undertaken, and that is exploration and examination in order to ascertain the value of what we there possess. Very little information of a definite character can be obtained at present even concerning its geography, no matter how diligent the enquiry, and much less concerning its resources and capabilities, while to the great majority of our people this region is a veritable "*terra incognita*" of which no more, perhaps less, is known than of the steppes of Asia, or the deserts of Africa, and yet it is, so to speak, Canada's wood-lot. It occupies the same relation to the arable land to the south that the rough and uncleared portions of the individual farm do to the cultivated parts of it.

I have said elsewhere that we as a people occupy the position of a farmer who has settled, cleared up and erected buildings on the front of his farm, but who has never even visited the portion outside his enclosures. What would be the course of any intelligent farmer on starting to make a home on one of our bush lots? Certainly the very first act would be to explore and thoroughly examine every part of his homestead. He would then clear up those parts best adapted for the growth of crops, and leave the less productive portions for pasture, and the roughest of all to serve his purpose as a wood-lot; and this is precisely what the nation should do with reference to its unoccupied lands. The first thing to learn what we really possess and its character, and, second, to invite settlers to locate only on land which will reward them for their labour; and, third, to retain in the hands of the Government such forested land as is unfit for agriculture but is better adapted for the growth of timber than for any other purpose. The policy should be to afford the settler the means by which he may earn his living by granting him good land on which he can grow his crops, whereas to make him a gift of the natural timber outside his own homestead would be virtually giving him possession of a crop which he had no part in producing, but which was the natural product of the soil, and which it had taken a century to produce. This should be regarded as an asset of the whole country. There can be no valid reason whatever adduced to support the theory that the timber on non-agricultural lands should be given away to the individual. In the case of agricultural lands the farmer's intelligent labour is the chief factor in producing his reward, but in the case of the virgin forest he does

not produce it, but simply appropriates what nature unaided has taken perhaps a century or more to produce.

Forestry for several reasons is a subject that belongs peculiarly to the State. One reason why this is the case is the far-reaching effects which the forests have on the character of the country in modifying its climate, and in regulating its water supply, both of which affect the community at large. Another reason is owing to the length of time required for trees to attain maturity. A long period of from fifty to one hundred years or more is required for our forests to attain their greatest commercial value, so there is no inducement to the individual looking to his own immediate interest to engage in the raising of a timber crop when he knows that his earthly career will have closed long before the return for his labour can be realized: whereas the life of a nation is not measured by years only but by centuries.

We have in that great region, which is well described as our subarctic forest belt, as I have stated, a vast tract largely unfit for agriculture. Within it are many great lakes and rivers which owing to the cool temperature of the water contain fish of the best quality. The land is covered with timber, a large part of which it must be admitted, is of less commercial value than that growing farther to the south, but which is already attracting attention for the manufacture of pulp. The most widely distributed tree of that region is the spruce, white and black, which is *par excellence* the tree for that purpose. This region too is the home of a great variety of the most valuable fur-bearing animals, and it is scarcely necessary to say that their existence depends very largely on the preservation of the forest which is their home. We have also in these wilds, owing to the numerous rivers and streams with which the region abounds, and the rough and broken state of the country, rapids and waterfalls innumerable which will furnish sufficient power for all purposes and at little expense. Of its mineral wealth it is too early to speak yet, but there is little doubt that the explorer will find rich rewards for his enterprise in this virgin field. The larger lakes and rivers afford means of communication throughout almost every part of this great district.

When all these conditions are duly considered, surely we have a region of country worthy of careful investigation. A moment's reflection will reveal what an important part the forest exerts over its welfare. Permit the destruction of this forest covering by fire or otherwise, and what will be the result? To say nothing of the evil effects on the climate of the fertile lands farther south that would result from the destruction of this barrier against the northern air currents, the severe winter of those high northern latitudes will be made almost intolerable by the winds that will



then blow uninterruptedly over the denuded land; the streams bereft of the present natural reservoirs which the forest covering at their sources affords, will then be torrents in the spring time, and dry during the summer and winter months, causing destruction to the fish and to navigation; the fur-bearing animals and other game will practically disappear, and instead of having a land with many possibilities, we will have an arctic desert.

Fortunately the land in this great region is practically all in the possession of the Crown, so that little difficulty stands in the way of conservative forestry there. From what has been said it is evident that there is a great field for intelligent forestry in Canada which it should be the aim of the people and of the Governments, both Federal and Provincial, to have put in practice with as little delay as possible.

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Dr. A. Harold Unwin, formerly of the Dominion Forestry Branch, but now of the Imperial Forest Service, writes from West Africa that he has started work in the Western Division by inspecting concessions, i.e., timber limits that are being worked, and also rubber tree plantations that are already set out. This year two hundred new plantations are being worked, scattered over a tract of country about one hundred miles square, and as the inspection has to be made on foot, it takes some time to see the district.

The concessions cause a great deal of supervision, as no concessionaire may cut any tree under twelve feet in girth at ten feet from the ground, and must plant twenty mahogany seedlings for every large tree he cuts, and must also preserve any young mahogany growth he may find. The latter operations are directed by the forest service. There are twenty-eight foresters, all natives, for the work in the Western Division. In the Central Division there are six foresters. The latter division includes mainly rubber plantations, though there is splendid timber at some distance from the railroad.

The appropriation for the service is \$50,000, and gives ample for everything except the extension of the plantations. The revenue of the colony is good, and increasing, so that it is expected there will be a larger appropriation in the near future.

The foresters also have charge of the game in the districts, which consists of several herds of wild elephants, quite a responsibility to undertake.

There is no pine in the country, but the question of introducing Long Leaf Pine is being considered. It will grow well, and the imported timber stands the climates, ants, &c., splendidly.

## FOREST INFLUENCES.

*Professor J. B. Reynolds, Ontario Agricultural College.*

At the present time much is being said and written concerning the forest. Forestry problems include a consideration of forest management, of the forest as a resource, and of the forest as a condition. The last question, the forest as a condition, comprises the subject of this paper, and upon this subject I shall try to present the best information available.

Dr. Fernow states this question topically, as follows:

The forest exerts an influence

I. Upon the climatic condition within its own limits and beyond.

II. Upon the distribution and character of the waterflow.

III. Upon the mechanical condition and erosion of the soil under its cover.

I. The climatic influence of the forest is, conjecturally, four-fold: (1) Upon the temperature of the air and of the soil; (2) upon winds and storms; (3) upon evaporation and the humidity of the air; (4) upon the precipitation—rain and snow. I say conjecturally, for the influence of the forest upon precipitation is by no means established, or generally admitted.

### *Control of Temperature by the Forest.*

The forest exerts its influence upon temperature by reason, principally, of the tree-crowns. These shade the ground and prevent the heat of the mid-day sun from having its full effect; conversely, the same crowns check the radiation of heat from the forest soil and air at night and in winter. Thus, the maximum temperatures within the forest are lower than those in the open, while the minimum temperatures are somewhat higher. In summer, the lowering of the maximum is much greater than the raising of the minimum. In winter the extremes are about equally reduced. Hence, the net effect of the forest in summer is, to lower the mean temperature of the forest air; and in winter, this cooling effect almost or entirely disappears. The net annual result is to cool the air—the mean annual temperature within the forest being lower than that in the open; and to moderate it, the extremes of high and low, both daily and annual, being reduced. The moderating effect of the forest is much greater than its cool-

ing effect. The amount of influence thus exerted depends, of course, upon the character and the closeness of the tree-crowns,—a thick stand of forest having a greater quantitative effect, in the direction indicated, than a thin stand; while an evergreen forest has less effect in summer, and greater effect in winter, than a deciduous forest.

### *Control of Winds and Storms by the Forest.*

One of the most important influences of the forest is due to its action as a wind-break. On its windward side, the effect of the forest is slight. But on the leeward side, the checking of the velocity of winds results in partial or complete stagnation of the air, with the phenomena attendant upon stagnation, namely, increased humidity of the air, decreased evaporation from the ground and from plants, higher temperature during the day, and lower temperature at night. Hence the effect of the windbreak is occasionally injurious, in favoring night frosts. But this is only occasional. The ratio between the *width of the area protected* and the height of the windbreak, has been variously stated by different observers, but a moderate estimate is, that for every foot of height of the windbreak, an area of ten feet in width is protected. Thus a belt of trees 30 feet high will protect from cold, drying winds, objects on its leeward side at a distance of 300 feet back from the belt.

*Protection from lightning* is, in all probability, afforded to buildings by single trees, to a greater extent by clumps and belts of trees, and it is equally probable that extensive forests, while they may increase the frequency, reduce the intensity and destructiveness of thunderstorms over their own areas and beyond.

### *Influence of the Forest on Evaporation and Humidity.*

In the forest, evaporation from three sources is to be considered: (1) Evaporation from the soil; (2) transpiration from the leaves; (3) evaporation from rainfall intercepted by the leaves, branches and trunks of trees. German experimenters have established for these quantities the following values: As compared with the amount evaporated from a free water surface in the open (1) the evaporation from soil under forest litter and within the forest, is 13 per cent; (2) transpiration from the leaves, 77 per cent; (3) evaporation of intercepted rainfall, 61 per cent; total, 151 per cent. On the same basis of comparison, the amount of moisture added to the air over cereals on the average is 173 per cent; over sod, 192 per cent; over bare soil, 60 per cent.

The forest, therefore, is more conservative of moisture than sod or cereals crops, but returns to the air  $2\frac{1}{2}$  times as much moisture as does the bare soil.





TREES AND SHRUBS AT EXPERIMENTAL FARM,  
Brandon and Indian Head.



EXPERIMENTAL FARM AT INDIAN HEAD,

(1) Row of Poplars. (2) Balm of Gilead. (3) Manitoba Maple. (4) American Elm.

The absolute amount of water-vapor in forest air is very slightly greater than that in the open, and on account of the lower temperature of forest air, its relative humidity is generally higher than that of air in the open,

*The Influence of Forests upon Precipitation.*

It has been generally stated by those anxious to emphasize the deleterious effects of deforestation, that the wholesale destruction of the forests has resulted in decreased rainfall over the deforested areas. This may be the case, but positive proof is lacking. It seems probable that the rainfall over certain parts of Ontario has decreased within the last 25 years. But whether this is a consequence of the clearing of the land, or merely a result of those changes of climate that occur over large cycles of time, who can say? There is no component of the climate that is more variable and uncertain than the rainfall. An experimental inquiry into the relation between the forest and rainfall is, from the very nature of the problem, exceedingly difficult. To conduct such an inquiry, all factors, other than the forest, that can cause a difference in the observed rainfall, must be eliminated, and the experiment must cover a long series of years. Many such attempts have been made, with conflicting results. Experimentally the question is still undecided, but the consensus of opinion is that the forest has little or no influence on the amount of rainfall.

The question may be examined theoretically with some interest. Rainfall is the consequence of evaporation of moisture from the earth's surface, with subsequent condensation of vapor caused by cooling of the air containing it. Where there is no evaporation there can be no rainfall, unless vapor is carried over from some other area. Deserts are rainless because there is no evaporation there, and because the air above desert regions is too hot and dry to allow of cooling and condensation of vapor that may be carried over them; also these areas are usually so situated that vapor-bearing winds do not reach them.

Rainfall over any locality may be increased either by an increase of evaporation from the area in question, and a subsequent condensation and fall over this area, or by an attraction exercised upon large air movements whereby clouds and vapor-laden winds are diverted to the locality and precipitate rain thereupon.

Of the various causes of rainfall, the principal is the upward movement of moisture-laden air and the cooling by expansion as the ascending air reaches levels of less and still less pressure. This upward movement may be part of a great cyclonic movement, covering hundreds of miles in horizontal extent, such as



one of our winter storms; or it may be part of a merely local air-movement, such as our summer showers usually are; or it may consist of a forced movement up the slope of a mountain-side. The question is, to what extent may the forest modify any or all of these movements, so as to affect rainfall?

First, as to the cyclonic movement, even if evaporation is increased over a forested area, the vapor is carried possibly hundreds of miles by the great horizontal movements of air in this class of storms; hence, increased evaporation over a forest does not increase the rainfall. Next, can the forest induce atmospheric conditions that will divert the storm-path? Theoretically, this seems impossible for great cyclonic areas, and doubtful even for local storms.

Secondly, as to storms of local origin, such as the thunderstorms, vapor formed from any region may be deposited again over that region. Hence, if evaporation is increased by the forest, it seems likely that rainfall also in the summer time, when local storms abound, may be increased. Referring now to the table of evaporation given above, we may see that evaporation from a forested region is less than that from sod or cereals, but more than that from bare soil. The substitution by the farmer of grass, root, and cereal crops for the forest in Ontario, would, therefore, tend to increase evaporation from the cultivated areas, and thus, whatever effect the forest may have upon local rainfalls, would be intensified by deforestation and cultivation.

As it does not appear probable that the forest on a mountain side can intensify the effect of the mountain in causing rainfall, we are forced to the theoretical conclusion that the effect of the forest in increasing rainfall can be but slight, and is probably in most regions nil. This theoretical conclusion is, on the whole, supported by such experimental data as have been obtained by the various investigators.

II. We come now to the consideration of the influence of the forest upon the distribution of the water-flow.

The forest controls the distribution of the water (precipitation) that reaches it, in the following ways:

- (1) By intercepting part of the rainfall.
- (2) By diminishing evaporation, within its own borders and beyond.
- (3) By transpiring large quantities of water, and thus diminishing the water-content of the soil.
- (4) By the influence of the forest-litter, (a) absorbing part of the precipitation, (b) offering a mechanical obstruction to surface flow and thus preventing run-off, (c) protecting the surface

soil from the beating of heavy rains; and thus keeping it in a more loose and receptive condition.

(5) By the shade and by its control of the winds it holds the snow cover until late in the spring, thus giving opportunity for the water to penetrate the ground slowly instead of running off in floods.

Of these factors 1, 3 and 4 (*a*) tend to diminish the amount of water in the soil, and thus to lower the water-table. The other factors tend to increase the water supply relatively, and to raise the water-table.

(1) The amount of rainfall intercepted has been variously stated by different experimenters. Of course, a light shower is almost entirely intercepted by the tree-crowns of a dense forest, and given back to the air immediately as vapor; while the greater part of a heavy or long continued rain must reach the ground. On the average from 10 to 20 per cent. of the total rainfall is intercepted. This amount is, of course, a direct loss to the forest soil.

(2) As has been already stated, the wind-breaking power of the forest is one of its most important influences. The cold, dry winds of winter, sweeping unchecked over the vast treeless plains of the North-West make it exceedingly difficult to rear fruit trees. Still more destructive to tree life is the warm, dry wind known as the Chinook. The Chinook, in Northern America, has been known to consume entirely in twelve hours a snow cover of 2½ feet deep, and to raise the temperature 57 degrees in 24 hours, while the humidity fell in the same time from 100 to 21 per cent. It is probable that the treeless state of the North-West is the result of these sudden and extreme changes of temperature and humidity. If a forest could be interposed in the path of the Chinook, its well-known action in checking the velocity of the wind, and in preventing extremes of temperature and humidity, would result in self-preservation. At any rate, the beneficial effects of shelter belts, clumps of trees, or wooded areas, upon orchards and crops that lie to the leeward is unquestioned. The high winds are checked, and the fruit trees are not subjected to winter drought. The snow is allowed to lie evenly, and to remain longer. The general effect, summer and winter, of the forest in reducing evaporation is most beneficial. An Illinois farmer sums up his observation upon this matter thus: "My experience is that now, in cold and stormy winters, wheat protected by timber belts yields full crops, while fields not protected yield only one-third of a crop. Twenty-five or thirty years ago we never had any wheat killed by winter frosts, and every year a full crop of peaches, which is now rare. At that time we had plenty of timber around our fields and orchards, now cleared away."

To mention the influence of the forest-litter (4), and the holding of the snow cover (5), suggests the third topic of my article.

III. *The influence of the forest upon the mechanical condition and the erosion of the soil under its cover*, is due simply to the impedance offered to the fall of water by the forest litter. A heavy rain falling unimpeded upon bare clay soil, almost invariably packs it, puddles it, and injures its texture, its capacity to convey water. Upon lighter soil the effect of the rainfall is less injurious, but is always in the direction of compacting. The forest litter, by breaking the force of the rain-drops, allows the soil to remain open and friable. The tree roots also, penetrating the soil, form channels for the entrance of water. Then, on sloping ground and on hillsides, the loose litter retards the run-off, and allows the water more time to percolate the soil. Thus, the rainfall is encouraged to become ground water, which, from the resistance offered by the compact subsoil, flows slowly down to lower levels, and supplies springs and streams perennially. In the forest, with its litter removed, the rainfall and the melted snow, instead of becoming seepage water, largely run off the surface, denuding the hillsides of serviceable soil, and stripping them to the bare rock; while the rapid rush of surface water occasions destructive freshets. Later in the season springs and streams dry up.

Mr. J. W. Toumey, of the Washington Bureau of Forestry, writes in the Year-book for 1903 on "The Relation of Forests to Stream Flow." The following is a quotation from that article: "In a careful study of the behavior of the stream flow on several catchment areas in the San Bernardino Mountains, it has been found that the effect of the forest in decreasing surface flow on small catchment basins is enormous, as shown in the following tables, where three well-timbered areas are compared with a non-timbered one:—

PRECIPITATION AND RUN-OFF DURING DECEMBER, 1903.

Area of Catchment basin.	Condition as to Cover.	Pre- cipita- tion.	Run-off per square mile.	Run-off per- centage of pre- cipitation.
Sq. miles.		Inches.	Acre-ft.*	Per cent
0.70	Forested.....	19	36	3
1.05	do ....	19	73	6
1.47	do ....	19	70	6
0.53	Non-forested.	13	312	40

At the beginning of the rainy season, in early December, the soil on all four of these basins was very dry as a result of the long dry season. The accumulation of litter, duff, humus, and soil

\*640 acre-feet equal 12 inches of precipitation over a square mile.



on the forest-covered catchment areas absorbed 95 per cent of the unusually large precipitation. On the non-forested area only 60 per cent of the precipitation was absorbed, although the rainfall was much less.

RAIN-FALL AND RUN-OFF DURING JANUARY, FEBRUARY AND MARCH, 1900.

Area of Catchment basin.	Condition as to Cover.	Pre- cipita- tion.	Run-off per square mile.	Run-off per- centage of pre- cipitation
Sq. miles.		Inches.	Acre-ft.*	Per cent.
0.70	Forested.....	24	452	35
1.05	do .....	24	428	33
1.47	do .....	24	557	43
0.53	Non-forested.	16	828	95

The most striking feature of this table as compared with the previous one is uniformly the large run-off as compared with the rainfall. This clearly shows the enormous amount of water taken up by a dry soil, either forested or non-forested, as compared with one already filled to saturation. During the three months here noted, on the forested basins about *three-eighths* of the rain-fall appeared in the run-off, while on the non-forested areas *nineteen-twentieths* appeared in the run-off.

RAPIDITY OF DECREASE IN RUN-OFF AFTER THE CLOSE OF THE RAINY SEASON

Area of Catchment basin.	Condition as to cover.	Pre- cipita- tion.	April run-off per sq. mile.	May run-off per sq. mile.	June run-off per sq. mile.
Sq. miles.		Inches.	Acre-ft.	Acre-ft.	Acre-ft.
0.70	Forested...	1.6	153—	66—	25 —
1.05	do ..	1.6	146—	70	30—
1.47	do ..	1.6	160	74	30
.53	Non-forest.	1.	56	2—	0

The above table clearly shows the importance of forests in sustaining the flow of mountain streams. The three forested catchment areas, which, during December, experienced a run-off of but 5 per cent of the heavy precipitation for that month, and which during January, February and March of the following year had a run-off of approximately 37 per cent of the total precipitation, experienced a well-sustained stream flow three months after the close of the rainy season. The non-forested catchment area, which, during December, experienced a run-off of 40 per cent of the rainfall, and which during the three following months

\*640 acre-feet equal 12 inches of precipitation over a square mile.

had a run-off of 95 per cent of the precipitation, experienced a run-off in April (per square mile) of less than one-third of that from the forested catchment areas, and in June the flow from the non-forested area had ceased altogether."

This has been the universal accompaniment of deforestation in Ontario and elsewhere. For the Ontario farmer this last consideration is of great practical importance. The question of preserving or renewing forests on a large scale is not for him. That is a State affair. But the denuding of local hillsides and watersheds can yet, in many sections, be stayed, or, if denuded, they may, without excessive labor and expense, be replanted, and the evils of wholesale removal of the forest, to some extent, mitigated.

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The Secretary has received several requests for copies of the First Annual Report of the Canadian Forestry Association, which it has been impossible to comply with, as the supply has been exhausted. If any members of the Association or others have spare copies the Secretary will be glad to be informed. No charge has been made for any of the reports of the Association when issued, but no doubt those who are anxious to obtain copies of the first issue would be prepared to do so even if it should be necessary to make some return to the present holders.

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There has been considerable excitement in Toronto recently in regard to the removal of shade trees from the streets. Whether the agitation is well directed or not may be a question, for sometimes the removal or replacing of trees is a necessity, considering it only from the point of view of the trees themselves. The form of butchery which passes for improvement in some civic administrations, and which is perpetrated by persons without even a rudimentary idea of proper cutting or pruning of trees, cannot, however, be too severely condemned, and there is great room for improvement in this respect in Canadian cities and towns.

## A GLANCE AT FOREST CONDITIONS IN NEW BRUNSWICK.

*G. U. Hay, D.Sc., St. John, N.B.*

Two years ago, while camping out near Kedron Lake, in the south-west part of New Brunswick, I came upon the remains of a magnificent white pine, lying prostrate in the woods. From this a section had been cut off close to the butt, the diameter of which was nearly three feet. The length of the piece cut off and carried away, perhaps for exhibition purposes, was a little less than five feet. The remainder of the tree, a fine bole, straight as an arrow, and nearly one hundred feet in length, was left to rot in the woods. It had evidently been felled not many years before, since the cut end was not greatly weathered, and there were traces of still unhealed wounds left on the smaller trees that had been caught in the death of this monarch of the forest as it crashed to earth.

The commercial value of this huge trunk, had it been manufactured into lumber while it was sound, could not, at the lowest estimate, be less than one hundred dollars, even though there were great difficulties in transporting it from the forest where it lay.

I recall the sight of another huge pine trunk in a secluded part of the forest in Northern New Brunswick. A single log had been taken from the fallen tree, which, covered with moss, had sunk half its thickness into the loose forest mould. It had lain there probably fifty or more years.

One is loath to believe that a lapse of fifty years has brought about no better sentiment in regard to forest preservation or the repression of individual acts of waste and vandalism.

If in the first instance quoted above the section of pine was used to exhibit the size of our trees and demonstrate our forest wealth, would not companion pictures of a huge moss-covered pine trunk rotting in the forest, or a picture of what may be seen everywhere in New Brunswick, decaying pine stumps of large size, about the only evidence now of its former existence as a timber tree, be just as appropriate to our needs—and far more useful—showing the wasteful lumbering that has been done in the past, and the necessity of an education of a practical and helpful character to teach people to respect trees and appreciate their value.

There is another picture, so common that it may be only briefly alluded to here, and that is of the destruction caused by



forest fires. There is scarcely a mountain or hill in New Brunswick from whose top one may not look down upon some scene of desolation where the ravages of fire are only too evident. And what is true of New Brunswick is true of the other provinces of Canada. Fortunately a bountiful Nature soon clothes these blackened wastes with fresh foliage. But the best parts of the forest are gone; and with them often the accumulation of leaf mould, the product of successive centuries of growth and decay.

The white pine as a timber tree has almost totally disappeared from our forests. The only large grove of red pine that I know of is the one found on a ridge or moraine extending into the great Nepisiguit Lake. The butternut or white walnut is becoming so scarce that it is now almost impossible to be obtained at any price. The same is true of the basswood. Thousands of noble hemlocks have been sacrificed for their bark. Large timber trees of the black spruce, which has been New Brunswick's greatest source of forest wealth, are becoming scarce, and the lumber operators of the present day are clearing out large portions of what remains and pulp mills may soon make havoc of the young growth.

Of the species of forest trees in New Brunswick, upwards of forty in number, the above include, with a few others, such as white spruce, cedar, haematack, the chief commercial products used for manufactures and export. The scarcity, with the consequent higher price of these staples, has brought into use others of less value, such as the hemlock, hitherto regarded only for its bark; even the "almost useless" poplar is found to be serviceable. Many of our hardwood trees, so-called, of which New Brunswick has many fine forests, have yet been untouched with the exception of birches, and are destined as their uses become better known, to constitute a great source of wealth to the province. Furniture made from yellow birch is little inferior to walnut. Rock maple, beech, elm and other hardwoods are also greatly prized for furnishings and other purposes.

A few days since I passed along a road that I had not seen since a child. Then there were some trees of generous size mingled with smaller growth that gave a pleasant shade. Now the whole character of the road seemed changed. There were a few hollow, fire-eaten trunks where once stood noble trees. Blackened stumps lined the road-sides, hidden at intervals by a struggling tangled growth of poplar, birch and spruce. And yet there are fine farms here and there, with well-cultivated meadows and a few houses—very few—with shade trees around them. But continued "choppings" and fires had made bare the uplands and bereft them of all semblance to beauty or utility. Tree weeds and blackened stumps are poor substitutes for fine trees along a roadside.

The above are a few of the many instances which might be adduced to show that man has exhibited a woeful lack of intelligence and judgment in destroying the woods which were so abundant when the country was discovered. In a comparatively few years he has wasted with a lavish prodigality Nature's slow production of hundreds of years. If great forests of useful and beautiful trees had been rare in this country they would have been husbanded with a care and forethought commensurate with their value; but because they have been so abundant and easy to convert into money, they have been destroyed with such an ignorance of Nature's processes, and with such a disregard of the rights of future generations, that the results are lamentable, and little short of calamitous. Forests that should have been kept intact by a wise system of cutting out the larger growths and allowing the smaller ones to mature, have been depleted of everything that would do for timber, while the refuse, strewn everywhere, has fed the fires and doomed many a fine forest region to destruction.

There are a few forests left intact in the depths of the New Brunswick wilderness where lumbermen have not yet penetrated and which are yet unmarked by the dismal tokens of the fire scourge. A few of these it has been my good fortune to visit—near the headwaters of the numerous branches of the Tobique. What a delight it was to wander through these great natural parks, chiefly of hard or mixed woods, through which one might drive a team, and to look upon the perfectly rounded boles of birches, spruces, elms, beeches, and occasional pines, their tops reaching to the height of from seventy to one hundred feet.

Mingled with my feeling of admiration was one of regret that in this beautiful province of New Brunswick, once so nobly endowed in its luxuriance of forest wealth, which might have increased under wise management with successive generations, trees had been destroyed where they should have been cultivated. Our forefathers in the settlement of the country did much for which it is presumed we are sufficiently grateful; but would that they had left undone some things which were done! Forest destruction, however, was a part of the first settlers' work, and a necessary beginning to civilization.

But among the early settlers there were many who spared some of the forest trees and found comfort in their beauty and shade. They did not begrudge a few feet of soil to the rightful owners, nor treat the trees as enemies or encumbrances, to be rooted out and destroyed. Many of the noble elms that adorn the broad intervals of the St. John, Kennebecasis, and other rivers, show the wisdom and sense of beauty that distinguished the early settlers of these regions. The magnificent grove of red and white pines, on the grounds of Judge Wilkinson, on the south

side of the Miramichi, between Chatham and Newcastle, the only easily accessible place, perhaps, in New Brunswick where a large grove of these fine trees may be seen, is a good evidence—and many others might be shown—that the old settlers loved trees, and spared them for adornment and shade near their dwellings.

Though we may regret the wastefulness and improvidence of former generations, the present duty is to preserve the remnants of our woodlands, to create a sentiment in favor of trees, and to protect and cultivate them in large forest areas, not only for purposes of lumber, but to husband the water supply of the country, maintain and increase its area of fertile soil, and reclaim by reforestation, wherever practicable, the fire-swept wastes. Nature cannot be looked to to restore our forests as they were. Man must give his intelligent assistance; and it would seem to be wisdom to begin now, when the demand for wood products is greater than it has ever before been in the history of the world, and when the market value of these products is constantly on the increase.

The first step naturally is to exercise a close supervision on our forests as they are, to restrain the output of lumber by judicious cutting, to leave standing all trees not up to a standard size, to get rid of undesirable trees, and the undergrowth that interferes with the admission of light, and to protect the forest from the danger of fire by removing all brush and refuse. The latter is obviously so important a preventive measure that some lumbermen—not by any means all—attend to this as a matter of wise economy, and their care is rewarded by greater exemption from fires, although, as in the case of a farmer freeing his fields from weeds, he is not safe unless his neighbors follow his example. The forest region on the Little Tobique River, New Brunswick, lumbered by Mr. G. F. Hale, is one that is kept in good condition, and there may be others which have not come under the writer's observation.

The regeneration of our forests cannot of course be expected from lumbermen, whose object it is to cull out the marketable trees without regard to the improvement or protection of the young growth. In individual cases such as that cited above, a lumber operator, after years of cutting, may leave his forest depleted of all the largest trees, but in such a condition under his intelligent management that it will prove a valuable asset to the country. How desirable a condition of things! But such ideal conditions may be realized if the forester is called in to the aid of the lumberman, if a rigid system of supervision is instituted by Government, and if instruction in forestry becomes a part of our general system of education. Plants, trees and other outdoor things interest all healthy children; and in our Nature-Study course, if the study of trees could be made prominent, and em-



brace a more intimate and intelligent knowledge of their habits and uses, and how to take care of them, it would lay a good foundation for future study. Such instruction can only be effective by a close acquaintance with the trees themselves, and by making the groves temples of instruction as they once were.

It is generally conceded that the study of forestry as a science belongs to the university or college, and not to the secondary schools. In the University of New Brunswick which is supported by the Government, there is a fine opportunity to establish a department of forestry, of which advantage might be taken by students from the other eastern provinces of Canada. The situation of the University at Fredericton, not far from the extensive forests, and near some of the greatest lumber industries of the province, is an ideal situation for a school of forestry. The improvement in practical courses in science, kindred to forestry, which has recently taken place in the University, renders it comparatively easy to establish a course in that subject, and thus materially advance the greatest industrial interest of the province. Clearly it is the duty of the Government to take this step.

It is now four years since Professor W. F. Ganong proposed a plan of reserving a section of forest about the Nictor and Nepisiguit Lakes for a provincial park, which incidentally should serve as a resort for the people, but where the best methods of lumbering might be tested and a practical study of forestry problems be made. Although the Government signified its approval of the scheme, no practical steps have since been taken to carry it into effect. The establishment of a department of forestry at the University would open a new avenue to activity for the young men of the province, the setting apart of a reserve forest which could easily be reached from Fredericton by the extension of the Tobique Valley Railway, would serve as a practical school for students, and open a new era in our lumber industry.

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## THE FOREST RESOURCES OF THE LABRADOR PENINSULA.

*A. H. D. Ross, M.A., Yale Forest School.*

The Labrador Peninsula has an approximate area of 560,000 square miles—two and a third times that of the Province of Ontario, or 65% of that part of the United States lying east of the Mississippi River. The interior of this vast territory has always been beyond the line of accurate knowledge, and previous to the explorations of Mr. A. P. Low, B.Ap.Sc., of the Geological Survey of Canada, not one-tenth of it had ever been properly mapped.

In 1892 it was my good fortune to accompany Mr. Low, as botanist and assistant surveyor, in his exploration of the East Main River, which rises near the centre of the peninsula and flows west into James Bay. In four months we journeyed more than thirteen miles in canoes, and did 368 miles of geological and micrometer survey work.

The peninsula is roughly pentagonal in form, being bounded on the south by the Saguenay, Chamouchuan, Waswanipi and Nottoway Rivers; on the west by James Bay and Hudson Bay; on the north by Hudson Strait; on the north-east by the Atlantic Ocean; and on the south-east by the St. Lawrence. The size of this immense peninsula may be judged from the fact that the air line distance between Cape Wolstenholme at the extreme north and the mouth of the Saguenay River is 1,040 miles, whilst Belle Isle is a trifle over a thousand miles from the mouth of the Nottoway River. From the mouth of the Nottoway to Ungava Bay is as far as from Ottawa to Port Arthur; and from Ungava Bay to the nearest point on the St. Lawrence is as far as from Ottawa to Halifax.

In 1893 Mr. Low and his assistants explored the Kaniapiskau and Koksoak Rivers flowing north into Ungava Bay; in 1894, the Hamilton River, flowing east into Hamilton Inlet; in 1895, the Manikuegan River, from Summit Lake southward to the St. Lawrence; and in 1896, the line was carried across from Richmond Gulf to Ungava Bay by way of the Clearwater, Stillwater, Larch and Koksoak Rivers. Mr. Low's reports upon the geology, climate, fauna and flora of the regions traversed show that the peninsula is not by any means the barren, worthless country it was once supposed to be. Its resources in the way of minerals, timber and fish are simply enormous, and if properly protected from exploitation will be a source of great wealth to the nation. This explains why the Province of Quebec lost no time in having its

northern boundary extended to the East Main and Hamilton Rivers, thereby acquiring an additional strip of territory 250 miles in width at its western extremity, and including the whole of Lake Mistassini, the Rupert River, the Nottoway River and surrounding country. The province now has an area of 351,873 square miles, and ranks next to British Columbia with 372,630 square miles. The name Labrador is now restricted to a twenty-mile strip along the north-east coast, and all the rest (about 350,000 square miles) of this immense territory is known as the District of Ungava.

The whole peninsula may be described as a high rolling plateau, underlain by glaciated Archæan rocks, and dotted with myriads of lakes and rivers, occupying nearly a quarter of the total area, and forming such a perfect network that with a knowledge of the country, it is possible to travel with canoes in almost any direction. The striæ and other glacial phenomena show that during the ice age the peninsula was completely covered with an immense sheet of ice, whose greatest thickness was midway between the headwaters of the East Main and Hamilton Rivers. From this central gathering ground the ice moved outward in all directions, gouging out rocky basins, and ploughing long shallow grooves between the low rocky ridges. Most of the smaller lakes have been formed by the deposition of glacial till in these grooves, and from the top of a ridge I once counted forty-six lakes lying all around me. The only portion of the peninsula not thickly dotted with lakes is the low country covered with marine sands and clays along the east coast of James Bay. Fully nine-tenths of the peninsula is underlain by medium to coarse-textured hornblende-granite-gneiss of different ages, and varying in color from red to light grey, a pinkish variety being very abundant. The average level of the interior is less than 2,500 feet, and over an area of 200,000 square miles does not vary more than three or four hundred feet. Towards James Bay there is a gentle slope, but along the Atlantic slope the level rises abruptly inland, and the coast is deeply cut by many narrow bays or fiords. Throughout the interior the ridges of low rounded hills seldom rise more than 500 feet above the general level of the surrounding country. Most of the large rivers have cut deep into the general level of the plateau, and their channels must be of very ancient origin. The rivers of the southern watershed seldom exceed 300 miles in length, and flow into the St. Lawrence. Several large rivers carry the waters of the western drainage area down to James Bay and Hudson Bay. The Koksoak and its tributaries carry the waters of the northern drainage area (nearly 60,000 square miles) down to Ungava Bay. On the eastern watershed, three large rivers flow into Lake Melville, at the head of Hamilton Inlet. The lakes and rivers interlock so closely that the longest



portages never exceed two or three miles. The lakes vary in size from small ponds to great sheets of water hundreds of square miles in extent, the twelve largest being Mistassinni, Michikamau, Kaniapiskau, Minto, Clearwater, Attikonak, Apiskigamish, Ashuanipi, Mistassinis, Nichikun, Manuan and Pletipe.

The large lakes and most of the rivers of the interior contain an almost inexhaustible supply of food fishes of large size and superior quality. White fish averaging four pounds and running as high as fourteen pounds, are abundant; lake trout averaging eight pounds and up to forty pounds are plentiful; brook trout from one to seven pounds occur in many of the rivers; pike from two to fifteen pounds abound in the quiet flowing streams of the southern, eastern and western watersheds; pickerel and chub occur in many of the smaller streams; ling from two to fourteen pounds are common in all the deep lakes of the interior, and are an important source of food for the Indians; suckers are the principal food of the Indians of many parts of the interior; a species of sturgeon is taken in great quantities half way down the Rupert River; and Atlantic salmon ascend many of the rivers in great numbers. When access is had to them by rail, these fisheries will become immensely valuable.

Most of the soil being derived from the underlying Archæan rocks is a mixture of sand, clay and boulders of various sizes. Along the river valleys it has been greatly improved by the rearrangement of the till and an admixture of sediments. In the vicinity of Cambrian limestones and shales, it is of a heavier nature and better suited for the growth of timber. With the exception of the higher hills and ridges, the forest is continuous over the southern part of the peninsula, as far north as the fifty-fourth parallel. About latitude fifty-five only half the country is timbered. As we go north the trees become smaller, and about latitude fifty-eight they disappear altogether.

The forest is almost entirely coniferous, and is of the regular northern type, consisting principally of spruce, larch, balsam fir, scrub pine, poplar, and birch. The latitude, height above sea-level, distance from sea-coast, topography of the district and character of the soil, all play an important part in the distribution of each species.

The black spruce (*Picea nigra*, Link) forms about ninety per cent of the forest, and grows freely, either in cold sphagnum swamps or on high hills covered with sand or heavy glacial drift. As a rule it occurs in dense thickets, with long naked stems, and on the southern watershed these thickets are so dense that the trees seldom reach a large size. Northward the stands are not so dense, and the stout trunks are often clothed to the ground with branches. In all cases the branches have a characteristic droop which enables one to recognize the tree almost as far as he

can see it. In dense stands the lower branches are generally festooned with "bearded moss" (*Usnea barbata*) which gives the forest a most weird appearance. The wood is light and soft but not strong. It is fairly stiff, however, and is used for masts, spars and various small articles where a stiff wood is required. In color it is a pale yellow-white, with thin sapwood, and in cross-section shows thin resinous bands of small summer cells and narrow conspicuous medullary rays. This explains why it is so apt to split when nailed. The prevalence of knots also detracts from its value as a saw-timber, but its long fibre makes it an excellent timber for the manufacture of wood-pulp. Its fuel value is 45, which shows it as good a fuel as chestnut, and better than Box Elder (*Acer negundo*, L.)

"Essence of spruce" is prepared by boiling the young branches and evaporating the extract to the thickness of molasses. It has a bitter astringent acid flavor, and is said to be a useful preventive of scurvy. "Spruce beer" is made either from the "essence," or by adding molasses or sugar to a decoction of the young branches and allowing the whole to stand till it ferments. The gum is often collected and used for the preparation of chewing gum, whilst the pollen is frequently sold as *Lycopodium* powder.

The white spruce (*Picea alba*, Link) or cat spruce, occurs throughout the wooded area of the peninsula, and prefers a well drained soil; being confined mostly to the areas of the re-arranged drift of the river valleys and marine deposits along the coast, or to the heavier drift of the Cambrian area of the interior. South of the St. Lawrence watershed it is more widely distributed, and is found on rocky hills at an elevation of 2,000 feet. It is a splendid grower, and because of its long fibre is in great demand as a pulp wood. It has a fairly coarse texture, and is tougher, stronger and more elastic than pine. As our supplies of pine become exhausted, white spruce will largely take its place. Thus, whether we regard it as the pulp-wood or the saw-timber of the future, it is evident that it is one of the coming woods, and that it should be carefully protected from fire and wasteful methods of lumbering. At present it is used for railway ties, fence posts, telegraph and telephone poles, piles and pulping purposes. It has a fuel value of 40, and when absolutely dry, weighs 25½ pounds per cubic foot. The Indians macerate the fine roots in water, and use them to sew birch bark canoes, the seams being made water-tight with resin. As lumber the black and white spruces are not separated, and the red spruce (*Picea rubens*, Sargent) is often included. It is closely related to the black spruce, but is not as suitable for spars and masts. As pulp-woods the black and white spruce have been found to increase in value the farther north they grow. The value of the growing spruce for the whole Dominion is probably as great as that of all other trees combined, as

it extends from James Bay north-westward to the Yukon. In 1897 Mr. Henry O'Sullivan, D.L.S., C.E., explored the country between Lake St. John and the mouth of the Nottaway River. In his report he says: "Pulp is the industry of the coming age, spruce is the king of woods for pulp making, and this country is the home of the spruce." He might have added that the immense waterfalls in every part of the country furnish unlimited power for saw, pulp and paper mills.

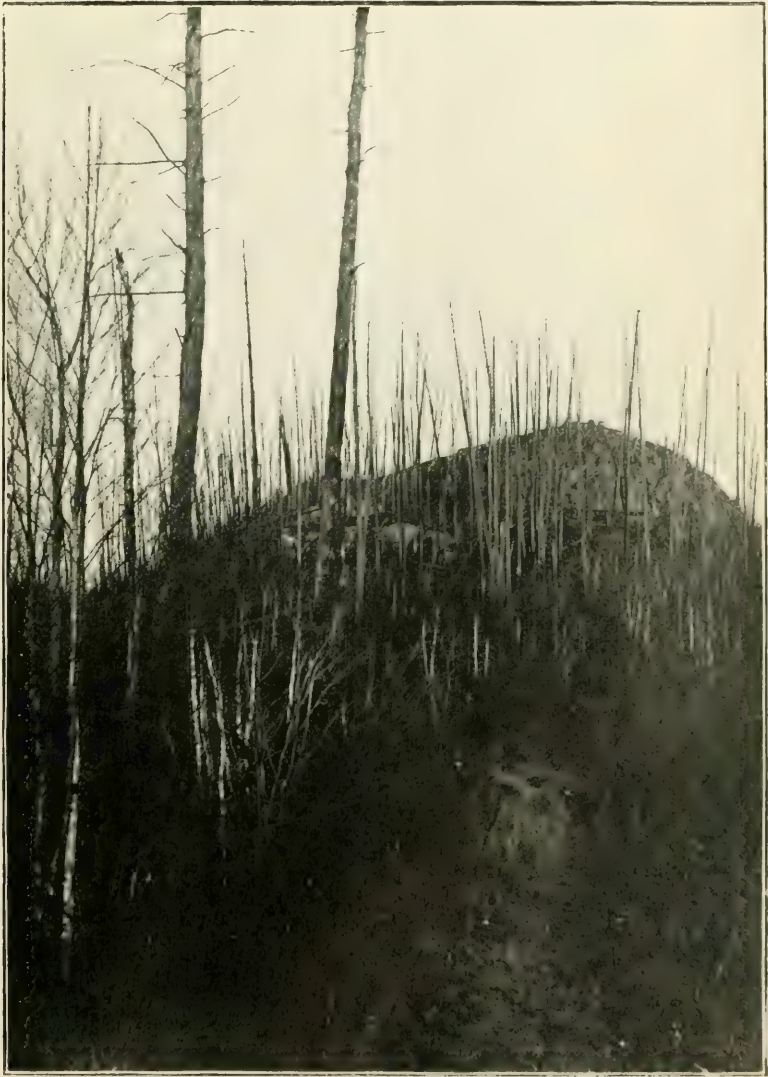
The black larch (*Larix americana*, Michaux), or tamarack, grows everywhere throughout the peninsula, and probably stands next to the black spruce in abundance. It is the hardiest tree of the sub-arctic forest belt, and continues as a tree to the very edge of the northern margin, where the black spruce is dwarfed to a mere shrub. In the interior it grows in all the cold swamps and is always the largest tree in the vicinity. Of late years, however, the European larch saw-fly has destroyed most of the larch between Lake St. John and Lake Mistassini, and the pest is spreading northward. The wood is rather coarse-grained, hard, heavy and very strong. In color it is a light brown, with thin, nearly white, sapwood, and contains broad, very resinous, dark-colored bands of summer cells, a few obscure resin ducts, and numerous, hardly distinguishable, medullary rays. This explains why it is such a stiff wood, and is so durable in contact with the soil. It is well adapted for use as scaffold poles, joists, rafters, railway ties, fence posts, telegraph and telephone poles, and for ship-building purposes. When thoroughly dry it weighs 39 pounds per cubic foot, and its fuel value of 62 seems to indicate that it is a trifle better than red maple (*Acer rubrum*) as a heat producer.

The balsam fir (*Abies balsamea*, Miller) prefers a wet alluvial soil, and occurs more or less plentifully about the margins of the large streams and lakes almost to the edge of the treeless area. From latitude fifty-six in the interior it ranges south-eastward to Cape Harrison, and south-westward to the mouth of the Great Whale River. In the Mistassini region and along the lower Rupert, it grows in abundance with white spruce, aspen and canoe birch.

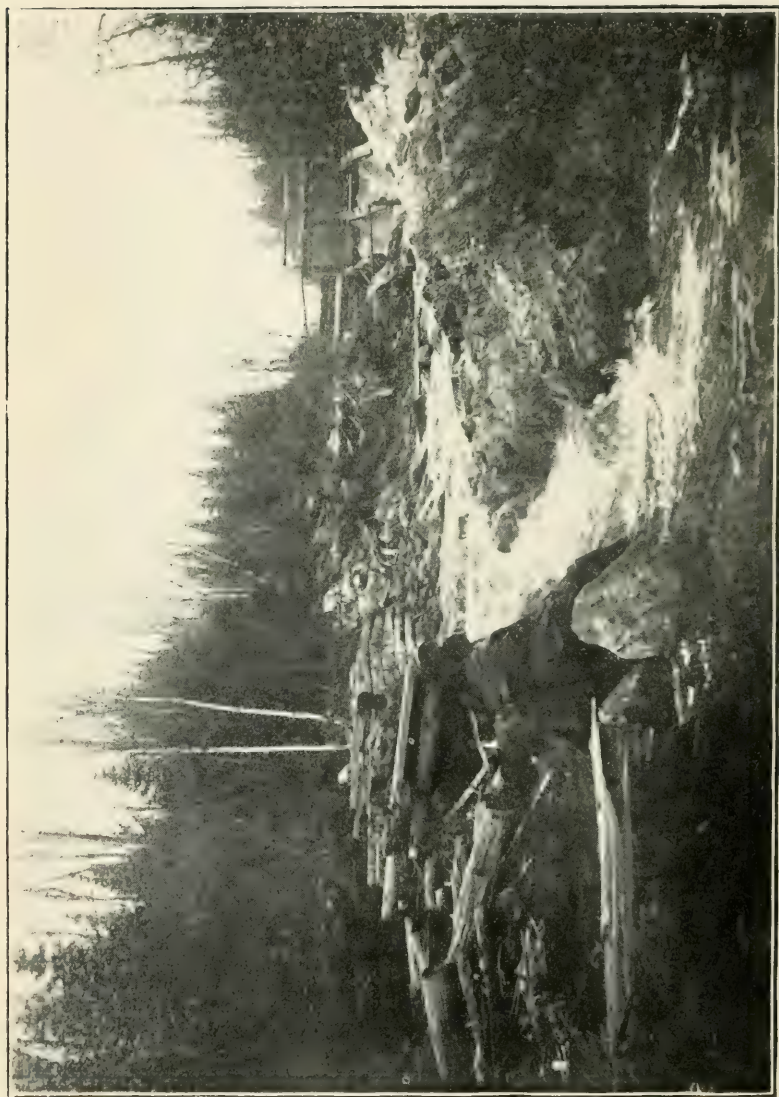
The wood is very light, soft, coarse-grained and perishable. The heartwood is of a pale-brown color, often streaked with yellow. The sapwood is lighter in color, is quite thick, and contains conspicuous narrow vessels of smaller summer cells and numerous obscure medullary rays. Fuel value, 38; specific gravity, 24 pounds per cubic foot; makes a good pulp, and is sometimes sawn into boards for the manufacture of packing boxes, or even laths and shingles, if nothing better can be obtained.

Beneath the smooth bark of the tree a transparent straw-colored resin, faintly tinged with green, collects in "blisters" or





BURNED WHITE PINE FOREST.  
Nipissing Co., Ontario.



A LUMBERMAN'S DAM, CHERRY RIVER, UPPER OTTAWA DISTRICT.

"knobs." This resin is the "Canada Balsam" of commerce, so much used in the arts and for mounting objects to be examined under the microscope. It is of the consistency of honey, and has a pleasant aromatic odor and slightly bitter flavor. It is usually collected in small iron cans fastened to a pole, and furnished at the top with iron tubes sharpened at the end. The tube is pressed against the resin blister to puncture it, and the gum flows down the tube into the can. An average tree yields about half a pound of balsam.

The Banksian pine (*Pinus banksiana*, Lambert), gray pine, scrub pine, jack pine, Labrador pine, or "Cypress," grows freely on the dry, sandy drift ridges and rocky hills of the burned-over areas of the western half of the peninsula between the St. Lawrence and Whale Rivers, but does not thrive on the low swampy land along the eastern coast of James Bay. The wood is close-grained, soft, fairly strong, and weighs about 30 pounds per cubic foot. In color it is pale brown or rarely orange, and the nearly white sapwood is quite thick. Its suitability for mine props and general construction work has not yet been appreciated. When large enough it is suitable for railway ties, and occasionally is sawn up for lumber. Recent experiments show that good pulp can be made from it. It has a fuel value of 48, and a dry weight of 30 pounds per cubic foot.

The aspen (*Populus tremuloides*, Michaux) does not seem to grow north of latitude fifty-four, and is somewhat fastidious as to soil. It prefers gravelly hillsides or moist sandy spots in the river valleys and along the lake shores. In the western part of the peninsula it grows abundantly on the unmodified glacial till of the drift ridges, but about the headwaters of the East Main and Hamilton Rivers (where the ice sheet was thickest) it is rather scarce. Its tiny seeds are provided with long silky hairs, which scatter them far and near with every wind that blows, and the seedlings grow rapidly in exposed situations. This explains why the aspen is the most widely distributed tree in North America, and also why it is generally the first tree to take possession of the soil on burned-over areas. Its roots prevent the washing away of the soil from steep slopes, and its leaves and branches afford shelter to the seedlings of longer-lived trees. It acts as a nurse tree towards most conifers, and plays a most important part in the re-stocking of our northern forests. With its pale bark, slender pendulous branches and shimmering leaves, it is a most graceful tree, and enlivens the sombre landscape with broad bands of color, light green in summer, but in autumn glowing like gold against the dark cliffs and gloomy conifers.

The wood is close-grained, has a cottony fibre, and is quite light and soft; but is neither strong or durable. The heartwood is of a light-brown color, and the thick sapwood is nearly white.



Its chief value is for the manufacture of pulp for paper, but it may also be used for fence rails, fuel, tannery or boxes. Dry weight, 25 pounds per cubic foot; fuel value, 40.

The balsam poplar (*Populus balsamifera*, Linnaeus), or rough-barked poplar, occurs farther north than the aspen, but is confined mostly to the heavy clay soil of the river valleys, or to the modified drift of the Cambrian areas. In the western interior it does not appear to grow north of Lake Mistassini. At Cambrian Lake (latitude 56°) on the Kaniapiskau River, it grows on low terraces to ten inches in diameter, but on higher ground is small and straggling. Along the lower Hamilton River it is quite common, but above the Grand Falls, which, it may be mentioned, have 302 feet of a sheer drop and a volume of about 50,000 cubic feet of water per second, is not seen again till the Cambrian area is reached at Birch Lake. The wood of balsam poplar is light, soft and fine-grained, and is well-suited for the manufacture of paper pulp, pails, tobacco boxes and small packing cases. The tree received its name because of the balsamic sticky exudation of the leaf-buds. In full foliage it is a splendid object as the wind blows through its branches, displaying the brilliant colors of its leaves, which are dark green above and rusty-looking below. The pollen of the poplars and spruces often blows across a lake in such large quantities as to form quite a thick film on its surface.

The white or canoe birch (*Betula papyrifera*, Marshall) grows everywhere in the southern part of the peninsula, and often forms dense thickets on hillsides which have been traversed by fire. With its gleaming white trunk, luxuriant dark foliage, and open, airy, graceful head, it is always a picturesque feature of the forest landscape. About Hamilton Inlet it grows to ten inches in diameter, but towards the upper waters of the Hamilton River seldom exceeds eight inches. Northward the trees are smaller, and the Indians have to import their bark for canoe-building. As the semi-barren lands are approached, the mixture of dwarf birches and willows growing on the hillsides form almost impenetrable thickets.

The wood of canoe birch is light, strong, hard, tough, and very close-grained. The Indians use it for axe handles, sleds, paddles, snowshoe frames, and many other articles requiring a light, strong, tough wood. There is no American species to excel it as a spool wood. It is also used for the manufacture of bobbins, turned boxes, bowls, shoe lasts, shoe pegs, for interior finishing, and for the manufacture of furniture. In the settled portions of Canada most of the white birch has disappeared, but in the Labrador Peninsula vast areas yet remain to be exploited.

The heartwood is light-brown, tinged with red, but the sapwood is nearly white and quite thick. It has a fuel value of 59, and weighs 37 pounds per cubic foot when perfectly dry. The

bark is tough, resinous, very durable and impervious to water. For the construction of canoes, baskets, drinking cups, and a covering for his wigwam, the Indian finds it simply indispensable.

The arbor vitae (*Thuja occidentalis*, Linnaeus), or white cedar, occurs in only a few places between the Rupert and Nottoway Rivers, and south-eastward to the St. Lawrence. It prefers swampy places in which it generally occurs in dense stands. The wood is light, soft, brittle, and rather coarse-grained. The thin sapwood is nearly white, but the heartwood is yellow-brown and quite fragrant. The wood is very durable in contact with the soil, and is much used for posts, poles, ties, rails, shingles, etc. It weighs almost 20 pounds per cubic foot, and has a fuel value of 32. The thick layers of sapwood are easily separated, and are often used to strengthen birch bark canoes or to weave baskets. In the southern region the undergrowth consists mostly of Labrador tea (*Ledum latifolium*), pale laurel (*Kalmia glauca*) and blueberries. In damp places there is a considerable depth of sphagnum mosses, but as we go northward it is gradually replaced by white lichens or reindeer mosses which grow everywhere throughout the semi-barren and barren regions. Willows and alders fringe the shores of all the lakes and rivers of the forested area. In the semi-barren areas willows and birches creep up the sides of the hills to above the tree line. On the elevated lands beyond the semi-barrens they are only a few inches high.

The forest areas of commercial importance are chiefly confined to the southern part of the peninsula, and mostly to the lower courses of the streams flowing into James Bay and the Atlantic Ocean. So long as our supplies of pine hold out, spruce cannot compete with it, as pine is the lumber *par excellence*. The supply of pine is limited, however, and in a very few years spruce will largely take its place for many kinds of work. Besides this, spruce is an excellent pulpwood, and is accompanied by considerable aspen, balsam poplar and balsam fir, all of which make excellent pulp. The Crown Lands Department of the Province of Quebec estimates that in the Lake St. John district alone (3100 square miles) there are a *hundred million cords* of pulpwood. This figure is based on the extremely low estimate of five cords per acre. If the true average per acre were used, and a calculation made for the total forested area of the peninsula, the result would be beyond all belief. The available raw material is sufficient to provide for an annual output of millions of tons of pulp for an indefinite period.

Most unfortunately, however, this immense forest has suffered dreadfully from fire, and in many places the vegetable part of the soil has been so completely burned out that a couple of centuries must elapse before it is fully restocked. Mr. Low states that the fires are of annual occurrence, and occasionally burn throughout

the entire summer, destroying thousands of square miles of valuable timber to the south of the central watershed. In 1894, he wrote: "These fires are due to various causes, but the majority of them can be traced to the Indians, who start them either through carelessness or intentionally"; also: "At least one-half the forest area of the interior has been totally destroyed by fire within the past twenty-five or thirty years." This is a most alarming state of affairs, and causes the Bureau of Forestry a great deal of anxiety, as the general public seems perfectly apathetic about the matter. When Canadians begin to look upon the forest as belonging to the nation—as an extremely valuable national asset—they will insist upon having it better protected from fire. Meantime the Bureau has done some very effective work in diminishing the number of fires in the forests of the far north and north-west. At every portage along the principal canoe routes, notices, printed in English, French and Indian dialects, have been posted, warning travellers of the danger to the forest from fires which have not been completely extinguished, and there is plenty of evidence to show that these warnings are heeded. The greatest danger seems to be from settlers, hunters and tourists, very few of whom seem to understand the extremely inflammable nature of these northern forests. In hot weather the moisture is thoroughly dried out of the gummy leaves and branches, and the mossy ground is as dry as tinder. A tiny spark at such a time as this may give rise to one of the wildest scenes of destruction of which the world is capable. The resin and turpentine in the leaves burn with great rapidity, and the trees stand so close together that an irresistible front of flame is soon developed and sweeps forward, devouring the forest before it like dry grass in a running prairie fire. The pitchy trees burn almost explosively, great sheets of flame extending to a height of two hundred feet from the ground, and darting forward to bridge over open spaces, such as lakes and rivers, and start afresh in advance of the main column. The speed of such forest fires is almost incredible, one of them being known to travel 130 miles in 12 hours, or nearly eleven miles an hour. In a few hours millions of dollars worth of timber may be swept out of existence, and the soil impoverished for centuries. Most of the provinces have excellent laws regulating the cutting of timber on crown lands, but in all cases the protection from fire is entirely inadequate. In 1903 the Province of Quebec spent \$9,694 (\$17,000, less a fire tax of \$7,306) to protect a revenue of over a million dollars, but where will the revenue for the next fifty years come from if fire gets into the timbered areas? In the Gatineau district each fire ranger is held responsible for 360 square miles, on the lower Ottawa for 585 square miles, and in the St. Maurice district, for 1,316 square miles! This is certainly better than no rangers at all, but which of my readers would like to be held responsible for so great a



stretch of forest in a dry season? As a purely business proposition it seems to me that the Province of Quebec can well afford to spend \$50,000 per year in keeping fire out of its magnificent coniferous forests. Such an investment would prove to be the very best kind of insurance on a timber revenue, which is certain to increase tenfold in the next fifty years—provided the province has the goods to deliver.

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As a result of the visit of the representatives of the Canadian Forestry Association to Sackville University, in the Province of New Brunswick, in the early part of last year, a meeting of owners of timber lands and others was held at Sackville, at which steps were taken to request the Legislature of that province for special legislation to protect the forests of the County of Westmoreland from fire. As a consequence a special Act relating to that county was passed at the last session of the Legislature. This Act provides that the Municipal Council may, on the request of the holders of a majority of acres of forest lands, appoint a Chief Forest Ranger for the county, whose duties shall be to enforce the Fire Act, investigate fires, institute prosecutions, post fire notices, and authority is given him to call out such assistance as may be necessary to fight fires that occur. Deputy Rangers may also be appointed. The fund for payment of the service called the "Forest Protection Fund," is to be provided for by the fines collected for offences under the Act, and by a special assessment on forest lands to cover such additional amount as may be required.

In addition to the restrictions of the general Fire Act of the province, it is specially provided that fires near forest lands, except for cooking or warmth, shall not be allowed from the 15th April to the 15th June and from the 1st September to the 15th October, and from the 15th June to the 1st September only after permission has been received from the Ranger. No portable or other steam engine may be operated within twenty rods of any forest from the 15th April to the 15th October without leave from the Ranger, which may be granted with or without conditions. Other special provisions are that every male inhabitant must notify the Ranger of any fire he notices; that there shall be a presumption of negligence if railway companies cannot prove their locomotives to be properly guarded; that the fact of a person trespassing or loitering or camping on land where fire starts shall, in the absence of proof to the contrary, be evidence of guilt; that any person owning land on which brush, &c., is burned between the 15th April and the 15th October is to be considered responsible unless the contrary is proved.

## NOTES.

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We have secured as contributors to the Canadian Forestry Journal members of the staffs of the Forestry Bureaus of the Dominion and of Ontario, of the Geological Survey of Canada, of the University of Toronto, of Queen's University, and of the Ontario Agricultural College. In addition, we have promises of papers from others who have made special study of subjects related to Forestry. Our object will be to be of practical assistance to our readers, as well as furnishing general and scientific information in regard to forestry in a popular way.

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The Sixth Annual Meeting of the Canadian Forestry Association will be held at Quebec, on the 9th and 10th March, 1905. A good programme is being prepared, which will be thoroughly representative of forest interests throughout Canada. It is expected that the railway companies will give the same privileges in regard to rates as was kindly granted for previous meetings. Full announcements by circular will be made to the members of the Association at a later date. We trust the members will bear this meeting in mind, and make their arrangements so that the attendance shall be large and representative.

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Attention is called to two errors in the published report of the Canadian Forestry Association for 1904. A slight change in one of the words in the thirteenth line from the bottom of page 82, which was noted on the final proof of the report, resulted, owing to the necessity with the linotype machine for the withdrawal of the whole line in such a case, in the substitution of a line from the second paragraph above. The proper reading of the line is: "In Snow Lake we have the large trout (Touladi) (*Salmo namaycush*), and possibly." In the second last line of page 86, "thirty-five" should be "five."

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At the annual meeting of the Ontario Experimental Union, which was held at Guelph, on December 5th and 6th, the subject of forestry received considerable attention. Since 1901 there has been a forestry section in the Experimental Union, the object of which is to gather information about and to suggest means of

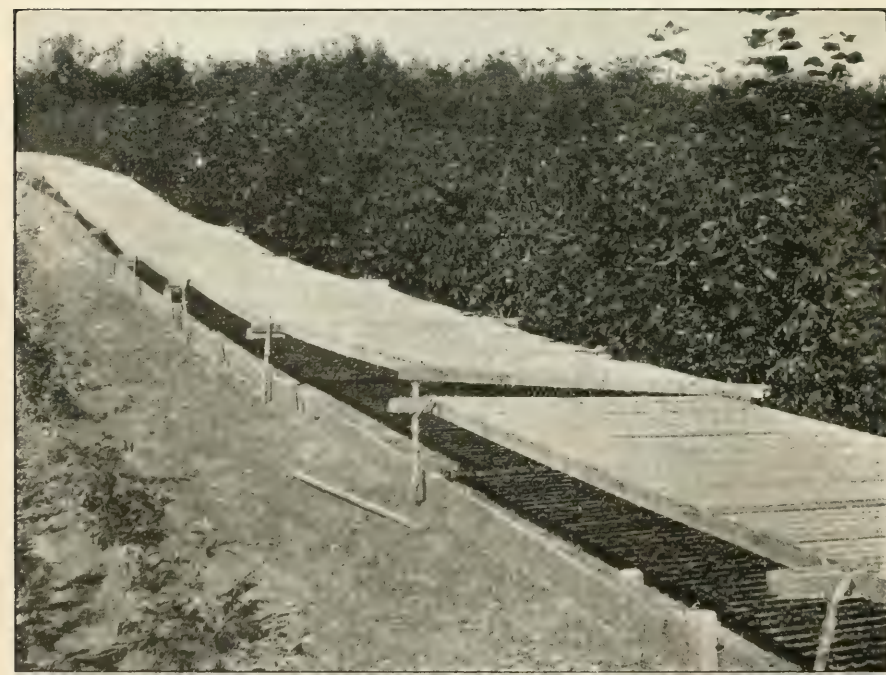


JACK PINE (*Pinus Murrayana*)  
In Natural Forest in Western Alberta





Nursery Rows of Green Ash Seedlings, 1 year old (Indian Head.)



improving forestry conditions in Ontario. Since it is an agricultural institution, the attention of the committee in charge has been confined almost entirely to farm wood-lots. From the first the Committee has urged that in order to increase the productiveness and efficiency of this much neglected and abused part of the Ontario farm, the Government should co-operate with the farmers of the province by giving instruction through bulletins and lectures on the subject of farm forestry, and by assisting those who require to plant by furnishing seeds or seedlings free, or at a cost price. The efforts of the Union have been successful in so far that a nursery has been established in connection with the Agricultural College, from which 100,000 seedlings will be distributed next spring. It is the intention before supplying plant material to applicants that a forestry expert shall inspect the proposed planting site, and advise the planter as to the preparation of the soil, species to plant, method of planting, etc., and only those applicants who agree to carry out the directions of the expert will receive trees.

Before a large meeting, on December 6th, Dr. Clark, Forester for the Crown Lands Department, Toronto, gave a most practical address, "Farm Forestry for Ontario." He first pointed out briefly that it is worth while to develop the wood-lot, for besides its local value as a shelter for the home and crops, the increased use of wood, diminished supply and advanced price make it a most valuable asset, especially in older Ontario.

He then took up more fully a discussion of some of the most common defects of farm wood-lots under the following heads:—

I. Affecting the character of the stand:

1. Farmers' selective cuttings.
2. Overcutting.
3. Grazing.

II. Affecting vigor of growth:

1. Lack of good soil cover.
2. Access of wind to soil.

By "farmers' selective cutting," Dr Clark meant the practice followed by so many of cutting out all the good trees and leaving only the cripples and weeds. Over-cutting is still more injurious than the farmers' selective cutting in that it causes the deterioration of the soil condition, and the trees do not develop desirable forms. Grazing, he said, is probably the most injurious agency in the wood-lot, making reproduction almost impossible, and injuring standing trees. Of the various domestic animals goats are the most injurious, sheep next, cattle next, and horses least injurious.

Lack of soil cover causes the drying out of the soil, and allows it to become hard, thereby preventing the percolation of

water into the soil and making it very difficult for reproduction to take place. Wind when admitted to the forest dries the soil, removes the soil cover, and produces an unhealthy condition of the stand.

As a remedy for these defects, Dr. Clark advised:

1. Shutting out of all stock.
2. Planting wind-breaks, especially on south and west.
3. Planting up failed places.

An interesting discussion followed Dr. Clark's address, which was taken part in by Mr. Nelson Monteith, M.P.P., Mr. Southworth, Mr. R. D. Craig, and others.

Dr. Clark gave also a short course of lectures, with practical demonstration in the Ontario Agricultural College, on wood-lots, to the Farmers' Institute speakers, so that they would be able to discuss the question more intelligently at their meetings during the winter.

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British Columbia has, in company with some of the western states, been a great sufferer from forest fires during the past season, the drought which made them a possibility lasting on through the summer. The air was filled with smoke throughout a great part of the summer in many districts. Survey work was seriously interfered with, and some parties could accomplish absolutely nothing in consequence of the smoke interfering with the view of the country. A member of one of such parties states that in the district in which he was working, or rather attempting to work, in southern British Columbia, fires were occurring on every hand, and nobody seemed to consider it his business to interfere. There were no railways in that vicinity, so that the blame for starting the fires could not be placed on them. In one case a prospector's stakes were found which were six days old, and a fire which cleared the claim and a tract around was evidently about the same age. One fire was approaching a small town day by day, and the only action taken by the inhabitants was to sit down and watch it from afar and speculate as to whether or not and how soon it would reach the town. Beautiful hillsides clothed with timber of the finest quality, green and flourishing when first visited, were found in a week or two after a mass of smoking ruins, their beauty and wealth reduced to smoke and ashes. The Bush Fires Act of British Columbia provides that all officials of the Government are required to enforce the provisions of the Act, but no special staff is charged with that duty, and as a consequence no vigorous action is taken. It is a remarkable fact that British Columbia is the only province of the Dominion having control of its own forests, with the exception of Prince Edward Island, which has very little forest, which has not made



some special provision for a protective staff. The forests of that province are of immense and increasing value. Nowhere else in Canada are as large areas of noble virgin forest found. The revenue received from them by the province is steadily increasing. The market for their product is extending. In Western Ontario red cedar shingles from British Columbia rule the market, and are found in every lumber yard. The demand from the western districts is becoming larger with the advance of settlement. A province so rich in forest wealth might surely be expected to see that some special officer is charged with the duty of protecting the forests from fire, and that he receives the necessary assistance at such times as required, even if it should result in a small increase in expenditure. In the railway belt in British Columbia, which is under the jurisdiction of the Dominion Government, such a service is in successful operation, and testimonies to its good work, even during the past trying season, have been numerous and favorable.

The Province of British Columbia should place itself in line with the rest of the Dominion in this respect.

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On an official call, issued by the American Forestry Association, a Forest Congress met in Washington, D.C., January 2nd to 6th, 1905. The purpose of this Congress was to establish a broader understanding of the forest in its relation to the great industries depending upon it; to advance the conservative use of forest resources for both the present and the future need of these industries; to stimulate and unite all efforts to perpetuate the forest as a permanent resource of the nation.

The Congress included Ambassadors, Ministers, and other representatives of foreign nations, members of the Federal House, Governors of States and Territories, representatives of Forest Services, Forestry Associations, Lumbermen's Associations, Irrigation Associations, Stockmen's Associations, Railroad Companies, Boards of Trade. Among the accredited delegates provision was made for ten from the Canadian Forestry Association, and the Association was well represented.

The subjects dealt with at the different sessions are as follows: (1) Relation of the Public Forest Lands to Irrigation; (2) Relation of the Public Forest Lands to Grazing; (3) The Lumber Industry and the Forest; (4) Importance of the Forest Public Lands to Mining; (5) Forestry in Relation to Railroad Supplies; (6) National Forest Policy; (7) State Forest Policy.

On the afternoon of January 5th, a special meeting was held in the National Theatre, which was addressed by the President to the United States, and other men prominent in industrial and national life.

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Some of the imports of lumber and timber into Canada from the United States during the past fiscal year are as follows, and are significant of the extent to which the Dominion is becoming dependent on outside sources, at least for hardwood supplies, the most of the woods mentioned being such species as are native to Canada, and of which there was at one time what was considered an abundant and inexhaustible supply. Cherry, chestnut, gumwood, hickory and whitewood are classed together with an import of 10,828,637 ft.; of mahogany, the quantity was 1,039,052 ft.; oak, 45,922,940 ft.; pitch pine, 15,055,596 ft.; walnut, 1,210,322 ft.; white ash, 2,416,063 ft.

The value of the export of forest products was \$33,091,032, logs being \$450,000, lumber \$28,000,000, almost equally divided between Great Britain and the United States, and square timber \$2,100,000 going to Great Britain mainly. Pulpwood to the value of \$1,788,049 was exported to the United States. Of manufactures of wood the value was \$3,633,223, the principal item being wood pulp, \$2,409,074, of which \$548,720 went to Great Britain and \$1,807,442 to the United States.

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The *American Lumberman*, referring to an estimate made in 1897, that not over 20,000,000,000 feet of white pine would be cut in Michigan, Wisconsin and Minnesota, calls attention to the actual cut since that date, which, at a production of 6,233,454,000 feet in 1897, has by steady reduction from year to year reached a figure of 4,791,852,000 feet, but makes a total of 39,353,218,000 feet. The *Lumberman* makes an estimate of the production for the next four years, as follows:—1904, 4,400,000,000; 1905, 4,000,000,000; 1906, 3,600,000,000; 1907, 3,300,000,000; and goes on to say that it is, perhaps, safe to estimate that there is still standing in the principal white pine states of the north stumpage in excess of 20,000,000,000 feet. Some of the mills in the north now have timber to last them ten or fifteen years, and it is doubtful if ten years from now there will be less than 1,000,000,000 to 1,500,000,000 feet of white pine cut and marketed, and in such event the statement that there yet remains only about 20,000,000,000 feet of white pine would have to be amended.

In 1892 the production of white pine in these states last reached a figure of eight billion feet, and its diminution to half that quantity means that the supply is nearing an end. In face of such a diminution in ten years, the ten billion feet of pine which are in sight in Ontario do not look at all like an unlimited supply.

## REVIEWS.

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*Trees and Shrubs Tested in Manitoba and the North-West Territories; Wm. Saunders, LL.D., Director Dominion Experimental Farms.*

In this bulletin are given the results of sixteen years of experience in the testing of trees and shrubs at the Experimental Farms at Brandon, Man., and at Indian Head, in the North-west Territories. The love of trees and shrubs is almost universal, and nowhere is it more strongly felt than on the North-west plains where these are scarce. Until within the past few years, large sums of money have been spent annually by settlers in the purchase of trees and shrubs from the east, many of which, being too tender to endure the climate, have perished the first winter. The tests carried out by the Experimental Farms have made such useless expenditure unnecessary. The results are also of use to Eastern Canada, as trees and shrubs which have been found hardy at Brandon and Indian Head may be safely planted in almost all other parts of the Dominion.

Of the maples, the sugar, red and Norway maples have been unsuccessful. The silver maple will grow in Manitoba, but the maple *par excellence* for the west is the Box Elder or Manitoba Maple (*Acer Negundo*). It grows readily and quickly from seed, and has been planted extensively. The European White Birch is hardy, but the cut-leaved variety less so. The Sweet and Yellow Birches give fairly satisfactory results, and the Paper Birch is native and hardy. The hickory, chestnut, catalpa, hackberry, beech, butternut, black walnut, and locust have been failures.

The Green Ash is the only one of that genus which is perfectly hardy. Among the hardy poplars are the native species and the Russian poplar. The Mossy-Cup Oak and the American Elm are native and grow without difficulty. Most of the coniferous trees tested have proved satisfactory. Notable exceptions are Bull Pine, White Pine, Hemlock and Douglas Fir.

Of the shrubs and climbing vines successful species are Viburnum, Lilac, Snowberry, Spirea, Elder, Buckthorn, Matrimony Vine, Honeysuckle, Hawthorn, Clematis, Bittersweet and others. Nothing will add more to the beauty of the surroundings of a home than a few such flowering shrubs.

The Experimental Farms have done a very useful work in this line of experiment, and the results have been brought together in a convenient form for reference.



*Tree Planting on the Prairies of Manitoba and the North-West Territories of Canada; Norman M. Ross, B.S.A., Asst. Supt. of Forestry.*

This is the first bulletin of a general nature issued by the Dominion Forestry Branch. It was written with the idea of affording practical information to the settler on the western prairies, as to the best methods of propagating, planting and managing hardy trees for shelter belts, windbreaks and plantations. The information given is from the results of planting and general nursery work, which has been found successful, and only such trees are recommended for planting as have been proved absolutely hardy under western conditions.

The advantages of plantations of trees are mentioned as the protection of crops and buildings, the holding of the snow, the preservation of moisture, the supplying of fuel, fencing and material for repairs, the beauty and comfort added to the home, and as a general result, the increased value of the property. The three main points to be observed in setting out a plantation are (1) that the soil must be thoroughly prepared before planting, (2) that only such varieties of trees should be used as are known to be hardy in the district, and suited to grow in the particular kind of soil, and in the situation where it is wished to plant them, and (3) that a certain amount of cultivation of the soil after planting is absolutely necessary,

Detailed instructions are given under each of these heads, followed by information as to the setting out of plantations, and descriptions of different species of trees, with suggestions as to their management. The bulletin is profusely illustrated, and is a creditable beginning for the Dominion Forestry Branch in its efforts to supply information to the public on forestry work.

*Cross-tie Forms and Rail Fastenings, with Special Reference to Treated Timbers: Herman Von Schrenk, U. S. Bureau of Forestry.*

The supply of railway ties is becoming a matter of absorbing interest to the railway companies, and investigations of methods for prolonging the life of such ties are, therefore, of practical moment for, while substitutes for the wooden sleeper have been and are being tried, the latter is still the main dependence of the railways. The object of this bulletin is not, however, to consider methods of preservative treatment of the wood, but forms and fastenings, and it starts with a warning that chemical treatment is not the only point to be considered in the life of a tie. Such treatment, though it may be done so as to prevent decay will not ensure woods of poor texture against physical deteriora-

tion through wear and tear. Recent tests have shown that large ties make the most stable roadbed, and the tendency of late years has been to increase their size, as it is feared that the enormously increased weight of engines and cars now requires a stronger piece of timber under the rails than the lighter equipment of the past. The idea that economy should be practised by using fewer ties to the rail length in view of the increased rigidity of the larger rails is decidedly negatived. This would mean a decrease of the bearing surface on the ballast, which would have the very opposite effect to what is desired, as it would mean a loss of stability. The effort to manufacture more ties by cutting them of a triangular shape, is unsatisfactory for the same reason. With the larger and stiffer rail a decrease in surface, if any is made, may well be on the upper side of the tie. A form of half-round tie is, therefore, suggested, with an upper surface of eight to twelve inches. It is probable that the increased stiffness of the rail will permit of a spacing, with a tie of the form proposed, very much greater than is possible with the form usually employed.

Ties are now being cut from trees of all diameters, from 9 inches upward. The influence which the new tie form will have upon the size of trees cut for tie purposes ought to be a marked one. It certainly would discourage the cutting of pole ties to a very considerable extent. It would not pay to make a tie out of a small tree, when by leaving it for a few years two ties could be made from the same tree. In other words, the present policy of cutting trees 11 or 12 inches in diameter would be found less profitable than cutting trees 16 or 17 inches in diameter. There is probably no other branch of the lumber industry in which so many small trees are annually destroyed, and the possible growth of forests retarded to such an extent as in the manufacture of ties. The practice of sawing ties from logs is going to be more and more prevalent as the old feeling that a sawed tie is not worth having disappears. The cutting of these trees will, moreover, make possible the use of large quantities of timber which now is practically wasted, and from which the lumberman has no return. This is particularly true of tops.

The subject of track fastenings is discussed in the remainder of the bulletin, because the writer believes that only with much modified systems of fastening can ties of most of the softer woods be made to last sufficiently long to pay for chemical treatment. With the present style of spike the soft wood tie does not hold with sufficient firmness to prevent undulations and creeping of the rail, which result in a more or less rapid wearing out of the tie. In driving the spike into the softer woods the fibres are broken to an unusual extent. As a result they do not withstand the lateral pressure of the rail, and consequently the spike hole

is rapidly increased to such an extent that the spike no longer holds. Water collects in the enlarged hole and decay sets in. Whenever a spike becomes so loose that it no longer holds, it is pulled out and driven in at another point. This constant respiking rapidly ruins the tie. In place of the ordinary spike the screw spike, such as is now used in Europe, is recommended. Screwed into a hole specially bored for it, it holds the rail firmly and prevents the injurious effects of the straight spike.

In tie plates the principal functions are to distribute the load from the rail on the tie, and to prevent the mechanical abrasion of the tie as far as possible. For the softer and inferior woods it is recommended that wherever possible a flat steel tie plate be used without spikes or flanges on the base of the plate, and that tests be made with wooden tie plates, one-fourth one-half and five-eighths inches in thickness, 6 to 7 inches long, and the width of the rail base under which they are used.

*Forest Resources of Texas; Wm. L. Bray, Bureau of Forestry.*

The general impression in regard to Texas has been that it is a prairie country rather than a forested state, and while this is largely true, still this report shows that the forests are of no small importance. The existence of the forest and its composition are to a large extent dependent on the rainfall, and from the low plains on the Gulf of Mexico to the plateaux of 4,000 to 5,000 feet and the mountains of 10,000, the rainfall gradually declines from 50 inches per annum to ten inches. The species of trees present a large variety. In the swamp and bay tracts of the lower region are bald cypress, tupelo, gum, magnolia and other characteristic trees of southern lowlands, with their peculiar adaptations to life on lands generally covered by water. The alluvial bottom lands support a valuable hardwood forest comprising different species of oak, ash, gum, cotton-wood, &c. Black walnut has practically all been cut out. The exploitation of the other hardwoods is developing rapidly, as northern manufacturing firms are reaching out farther for supplies. This is one of the new districts from which the supply for Canada will now come. In spite of this it is remarkable that lands are being cleared for settlement in this district by destroying the trees, a wasteful method that most people have considered was long ago relegated to the past. There are about 7,000 square miles of mixed holly pine and hardwood forest, among which tracts of pure stand of the former give a cut of 12,000 to 15,000 feet to the acre. Short leaf pine is also an important timber tree. The greatest timber producing area in Texas at the present time is that covered by Longleaf pine, comprising a tract of some 5,000 square miles. The stand is practically pure, and the trees make a large and perfect growth, yielding logs of a maximum diameter of from 36 to 40



inches, with a clear length of 60 feet. The soil on which it is found is sandy and most of it probably unfit for agriculture. The output is about three-quarters of a billion feet a year, and at the present rate of lumbering it is estimated that the supply will last for twenty years. The development of this industry is of interest, for southern yellow pine has become one of the chief competitors of white pine in the north. Longleaf pine seeds abundantly, but there is very little seedling growth, owing to the regular and frequent fires.

Farther to the west and on higher ground are found the prairie country and mixed forest growth. A peculiarity noticed here is the meeting of the northern and the southern species of trees, the former being dwarfed and altered so as to be designated under different specific names. In the mountain region Douglas fir and western yellow pine (*Pinus ponderosa*) occur.

*The Basket Willow; Wm. F. Hubbard, U. S. Bureau of Forestry.*

Willow Culture in England was among the many forms of industry which were temporarily or permanently stimulated by Napoleon's embargo Act. Great Britain had imported her osiers and baskets from Holland until her exclusion from the Continent led to the formation of plantations at home. The Society of Arts directed their attention to the subject, and gave premiums for the establishment of willow plantations. The willow is still considerably grown in England, where the principal cultivator of late years was William Scaling, and such districts as Nottingham and the fens of Cam'bridgeshire produce osiers of the highest quality; but the general labor conditions and the ease with which willow is imported from other countries have prevented it from being widely cultivated or manufactured. France, Italy, the islands of Sicily and Madeira, Belgium, Holland, Germany, Austria, and Russia, are all large growers of willow, and have a good export trade of osier rods and basket ware. In all these thickly populated countries, which abound in cheap labor, willow growing and basket making have followed the development of other manufactures to a very marked degree.

Willows are adapted to a wide range of soils and climatic conditions, and are therefore among the most widely distributed of trees and shrubs. The genus *Salix*, to which these plants belong, contains a large number of species, ranging from large trees to small low plants. From 160 to 170 species are known, inhabiting all regions, from the low grounds and river banks of temperate climates and warm countries to the arid Alpine slopes of mountains and to the boreal regions of both hemispheres. They occur in America from the Arctic Circle to the West Indies and the mountains of Chile. In the Old World they range

from Northern Europe and Asia to Madagascar and South Africa, and to the islands of Java and Sumatra.

The qualities required to constitute a perfect rod are extreme toughness, elasticity, a level, smooth, and brilliant white surface after peeling, good splitting quality, freedom from branches, great length of shoot in proportion to thickness, and a small pith. The development of a species which will produce such rods, and which at the same time is hardy and not liable to ordinary diseases, and a good cropper, is the end for which growers should strive. This demands that the greatest care should be exercised not only in the choice of species, but also in methods of culture. Good varieties give no results under careless methods; even inferior kinds will pay if well tended. It should be the object of every grower to lower the price and better the quality of his willow, for on this depends the future success of American osier culture. If rods equal to the French and cheaper in price can be put on the market, there will be an opportunity for a great expansion of basket and furniture manufactures, and the growers will more than make up in larger sales what they lose in price per pound. The net returns from properly managed plantations are estimated at from \$17 to \$76 per acre per annum for fourteen years.

The species usually planted are the Welsh or purple willow (*Salix purpurea*), the Lamley or Caspian Willow (*Salix pruinosa acutifolia*), the American green or almond willow (*Salix amygdalina*), and the white osier willow (*Salix viminalis*). This industry might find a place in Ontario, if not elsewhere in Canada.

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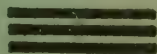




# CANADIAN FORESTRY JOURNAL.



APRIL  
1905



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

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OTTAWA, ONT. Department of the Interior.



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THE BOW RIVER VALLEY, FROM THE HOT SPRINGS

# Canadian Forestry Journal.

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VOL. I.

APRIL, 1905.

No. 2.

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## SIXTH ANNUAL MEETING OF THE CANADIAN FORESTRY ASSOCIATION.

THE Sixth Annual Meeting of the Canadian Forestry Association was held in the city of Quebec, on the 9th and 10th March, 1905, and was one of the best attended and most successful meetings yet held. Among those present were Aubrey White, Assistant Commissioner of Crown Lands, Dr. Judson E. Clark, W. H. F. Addison, E. B. Biggar, Editor Pulp and Paper Magazine, H. R. Muir, Canada Lumberman, Toronto; Hon. H. Hestock, F. W. Jones, R. Jardine, Jas. Leamy, of British Columbia; E. Stewart, Dominion Superintendent of Forestry, Dr. Robert Bell, Director of the Geological Survey, Gordon C. Edwards, Norman M. Ross, Roland D. Craig, H. C. Wallin, R. H. Campbell, Ottawa; E. G. Joly de Lotbiniere, H. M. Price, W. C. J. Hall, Monseigneur Laflamme, Hon. P. E. Leblanc, Hon. R. Turner, E. Baillarge, J. C. Langelier, Revd. T. W. Fyles, H. O'Sullivan and others, Quebec; Wm. Little, Hon. Recorder Weir, Douglas Weir, Thos. Walklate, Montreal; J. T. Bertrand, Isle d'Orléans; Col. T. G. Loggie, Fredericton; A. E. Alexander, Campbellton; E. J. Zavitz, Ontario Agricultural College; Professor Filibert Roth, University of Michigan; Dr. C. A. Schenck, Bilmôre, N.C.; A. Knechtel, L. S. Enmons, Albany, N.Y.; Angus McLean, Buffalo; W. G. Power, St. Pâcome; S. P. Grogan, Batiscan; Mossom M. Boyd, Bobcaygeon; W. C. Wilgress, Huntsville.

Most of the sessions were held in the Council Chamber of the City Hall, which had kindly been placed at the disposal of the Forestry Association by the Mayor and Council of the city of Quebec. The meeting was called to order by the President, Mr.

Aubrey White, and after preliminary business the report of the Board of Directors was read by the Secretary.

The report referred to the kindness of the Dominion Bureau of Forestry in having provided for the publication of the Annual Report, an important contribution to the work of the Association, and which took a heavy financial burden from its somewhat inadequate resources.

During the past year the Association lost several of its members by death, prominent among whom were Mr. John Bertram, Chairman of the Dominion Transportation Commission, Dr. W. H. Muldrew, Dean of the Macdonald Institute, Mr. W. C. Caldwell, M.P.P., of Lanark, and Col. Thos. Higginson, of Vankleek Hill. Feeling reference was also made to the loss sustained by the honored first President of the Association, His Honour Sir Henri Joly de Lotbiniere, and the Vice-President, Mr. L. G. Joly de Lotbiniere, in the death of Lady Joly de Lotbiniere, which had occurred during the year. The Secretary was instructed to convey the sympathies of the Association to the bereaved relatives.

A special effort had been made in the year 1904 to increase the membership by the sending out of circulars and by other means. The results were on the whole satisfactory, and resulted in a good addition to the membership, making the total 562 as against 479 reported at the previous annual meeting. Increases were made in all of the Provinces except Manitoba and Alberta, where there was a slight falling off. Outside of Canada, the United States heads the list with thirty-nine members, and the remainder are scattered among England, Ireland, Newfoundland, India, Honolulu, Germany, Denmark and Austria.

The receipts for 1904 were \$1,845.77, and the expenditure \$930.66, leaving a balance of \$915.11. The Association has again to thank the Governments of the Provinces of Quebec, Ontario and British Columbia, for the generous grants made by them to assist its work.

The Forestry and Colonization Commission of the Province of Quebec, and the Forestry Commission of Prince Edward Island, presented their reports to their respective Governments



in 1904. The Quebec Commission found that there is no antagonism between the holders of timber licenses and real settlers, but that difficulties have been created mainly by those desiring to take up land to speculate in the timber. They therefore urged the division of the public domain into settlement lands and merchantable timber lands, and the setting apart of non-agricultural lands in forest reserves. An extension and improvement of the fire preventive service was also considered by the Commission as a prime necessity.

In Prince Edward Island, the area of public land being but small, the Commission recommended that efforts should be made to encourage private enterprise in the planting of trees for the protection of agriculture and for ornamental purposes. The desirability of education on this subject was urged on the attention of the authorities.

Forest fires as usual caused destruction throughout the Dominion, but had been largely controlled by the fire rangers except in British Columbia where, outside of the Railway Belt, which is protected by Dominion rangers, no fire preventive service exists and the fires were numerous and practically uncontrolled.

The tree planting scheme under Dominion management continues to develop. During the year 1904, 1,800,000 trees were distributed to 1027 settlers, an average to each of 1752 trees. In 1905, the distribution will be 2,000,000 trees to 1120 settlers. The total distribution to 1905 will be 5,000,000 trees. At the Ontario Agricultural College provision for similar work for the Province of Ontario is being made.

A committee of the Board waited upon His Excellency the Governor General to ask him to be kind enough to act as Patron of the Canadian Forestry Association. His Excellency received the Committee most graciously, and was pleased not only to give his patronage, but far exceeded their expectations by stating that he would be pleased to do anything further in his power to assist the work of the Association, and suggested that, in the event of a meeting being held in Ottawa during the present season, he would be pleased to attend and might even arrange to have it held at Government House. This kindly action of His Excellency and the evidence of his sympathy with movements af-

fecting the well being of the Dominion should give him a high place in the respect and affection of Canadians, and especially of the members of the Forestry Association.

The President, in his address, referred to the pleasure it gave him to preside over the deliberations of the Canadian Forestry Association at its first meeting in the Ancient Capital. Here was the nursery of all the developments that have taken place in every direction throughout the Dominion. Under the French regime the first Crown Timber regulations were promulgated, and some of the problems which confronted the framers of the early laws have come down to the present day. The rights of the settlers and kindred matters are just as live subjects as they were two or three hundred years ago. Mr. White sketched the growth of the forestry movement from the Forest Congress, held in Montreal in 1882, to the meeting of the American Forestry Association in Quebec in 1890, and the establishment of the Canadian Forestry Association in 1900. He impressed the two great features of present importance in forestry as the provision for a proper fire preventive service and a division between the agricultural lands and those suited only for the growth of timber.

The first paper submitted was one on "Forest Fires in British Columbia," prepared by Professor R. W. Brock, of Queen's University. Anyone travelling through the Province is at once struck by the beauty and value of the timber and no less by the terrible havoc wrought upon it by forest fires. British Columbia, as a whole, may be said to be forest-clad, but the growth of trees is more luxuriant on the western slopes of the mountain ranges and the interior plateau contains wide stretches of open grass-covered hills and valleys. The higher mountain ranges rise above the tree line, and merchantable timber is confined to the valleys and to the mountain sides to a limited height. While British Columbia has in the aggregate a vast supply of timber, the only timber that has an immediate market value is that which is near transportation. The percentage of this lost by fire must be appallingly large and unless active steps are taken to prevent this destruction, only a relatively small amount of the timber now standing will ever reach the market. So numerous are the fires in a dry season that the whole country side may be



CEDAR TREES (*Thuja gigantea*) IN STANLEY PARK, VANCOUVER, B.C.

(By permission of Dominion Superintendent of Forestry)





buried under a dense pall of smoke. In a dry season like last year the fire is apt to consume everything. Last summer Professor Brock climbed up a hillside through fine green timber and about a week later came down the same place wading knee-deep in ashes. Not a vestige of anything combustible in the soil had been left, the hillside was as bare as the bottom of an alkali pond. Lightning, camp fires, smudges, sparks from locomotives, fires started for clearing land, cause forest fires, and some are set deliberately to clear the land for prospecting. At present one of the most serious handicaps in combatting the fires is lack of organization. It seems to be nobody's business to put out fires. The cost of protective measures should not be excessive nor should it be any barrier where so much is at stake.

Mr. Jas. Leamy, Dominion Crown Timber Agent at New Westminster, described the fire ranging system in operation in the Railway Belt in British Columbia under Dominion jurisdiction, which has resulted in the saving of a great deal of valuable timber. Even during the dry season of last year the loss was comparatively small. This was accomplished by the work of only eight rangers over an area five hundred miles in length and forty miles wide. There is need for a larger number of rangers to adequately supervise this large tract. Hon. Hewitt Bostock, R. Jardine, of the British Columbia Mills Timber & Trading Co'., and F. W. Jones, of the Columbia River Lumber Co'., spoke in the highest terms of the work accomplished under Mr. Leamy, and expressed their readiness, as holders of timber lands in the Railway Belt, to pay their share of an increased expenditure for a protective service.

Dr. C. A. Schenck, of Biltmore, North Carolina, urged the necessity for basing forestry on business principles, and expressed his pleasure at seeing that in Canada the movement was backed by the business men. He was glad to see that they realized the importance and value of the question. Dr. Schenck also impressed the desirability of delimiting the forest and agricultural lands and the reservation of forest land by the Government.

The paper on "Forest Insects," presented by Revd. Thos. W. Fyles, of Lewis, on Thursday afternoon, was exceedingly in-

teresting, and was well illustrated by a number of colored drawings of the insects described. Dr. Fyles' attention was first drawn to the subject of forest insects by their depredations in the woods of the parish in Quebec, where he was first settled. The careless tapping of the maple trees by a former proprietor of his land had made them the abode of horntails and beetles, while the brush and fallen trees of the surrounding woods were infested with many varieties of destructive insects.

Dr. Fyles divided the insects under two great heads, namely: biting insects, Mandibulata, and sucking insects, Haustellata. To the former class belong the borers in the tree trunks, the twig girdlers and the leaf devourers; to the latter, the cicadas, the scale insects and the plant lice. It is difficult to tell which of the two orders is more hurtful to vegetation. The insects which have come from foreign sources are the most to be dreaded. The larch sawfly that destroyed the tamarack of our northern forests is an example of this. The Gypsy Moth in Massachusetts caused an expenditure by the Legislature, in four years, of \$275,000 in the effort to exterminate it. The Tent Caterpillars and Tussock Moths are well known insects, destructive to the leaves of trees. The white grub and the cicadas feed upon the roots of plants. The cicada is an interesting insect from its long sojourn underground, lasting from three to seventeen years according to the species, feeding upon the roots of trees. Its loud stridulations are one of the most characteristic sounds of the summer.

The borers do a great deal of damage to timber and as an evidence of the manner in which they may be transported from place to place, Dr. Fyles related the case of one which dropped from the frame of a door in his own house, after having survived all the processes of finishing the wood. It must not be supposed that nature has left these borers to multiply and work their will without a check. There are a number of ichneumon flies engaged in reducing their numbers. Insectivorous birds and predaceous insects under ordinary circumstances keep the spoilers within bounds. And man may give his assistance to the same end by, for instance, preserving the insectivorous birds.

Professor Roth emphasized the importance of a study of for

est insects, from the experience of the United States in the Black Hills Forest Reserve. There the trees were dying mysteriously. An investigation by the Government entomologist established that it was the work of an insect, and from his knowledge of its life history, he was able to suggest remedial measures, which have resulted in checking the destruction and saving a great deal of valuable timber.

Col. T. G. Loggie, of the Crown Lands Department, Fredericton, submitted a paper on "New Brunswick's Forests," which contained a great deal of interesting information about that province. The area of New Brunswick is 17¾ million acres, of which 7¼ are Crown Lands. The settled portions of the province are principally along the river valleys and coast line; the interior forming one vast timber preserve and embracing a territory eighty miles wide and one hundred miles long, without habitation of any kind save the lumberman's or trapper's shanty, and no sound except the ring of the woodman's axe or the call of the hunter. Here is a domain fairly free from the ravages of fire, and timbered with many kinds of valuable timber. The greater part of this territory is unfit for cultivation, lying mainly on the granite and boulder formation. Everywhere over this belt both black and white spruce abound, with some pine and vast quantities of hardwoods, that have scarcely been touched, also large quantities of the largest and finest cedars in Eastern Canada. In the district to the south and extending to the Bay of Fundy, the cut has been heavy and fires have done serious damage. In the effort to check forest fires, an Act was passed in 1885, but as the expenditure on a protective service is limited to \$2,000 a year it has been impossible to do effective work.

One of the difficulties of administration has been settling or squatting on timber lands by persons who have no intention to make a permanent residence, but merely wish to obtain timber. One of the greatest needs is the separation of purely agricultural lands from those fitted only for timber growth. In this connection Col. Loggie indicated on a map of New Brunswick the district which it was desirable to immediately include in such a reserve.

Col. Loggie summed up his suggestions in regard to the for-

est policy of New Brunswick, under the following heads: (1) more effectual means for protection from fires; (2) the separation of timber lands from agricultural lands; (3) a carefully selected corps of foresters, permanently employed; (4) restrictions as to the cutting of undersized timber, and concluded as follows:—

“New Brunswick has yet a noble heritage in her forests. Let us then work together to preserve this heritage so that we ourselves and future generations may reap the benefits which nature has so lavishly bestowed. In conclusion let us not forget the old Scotch saying:—

“Be aye stickin’ in a tree, it’ll be growin’ when ye’re sleepin’.”

Great interest was excited by the reading of a telegram received by the President from Hon. W. C. Edwards, in which it was stated that Sir Wilfrid Laurier wished to have a Forestry Convention in Ottawa, during the coming summer or autumn. A resolution expressing the gratification of the Association at this announcement, and its readiness to assist in the proposed convention was unanimously adopted.

The banquet tendered to the visiting delegates at the Chateau Frontenac on Thursday evening, by the members of the Association in Quebec, was an unqualified success, and hearty thanks were tendered to the hosts for their splendid reception. Excellent speeches were made in response to the toasts by representatives of the Dominion, the different Provinces and the United States. Perhaps the brightest remark was made by Monseigneur Laflamme when, referring to the paper on Forest Insects read earlier in the day, he stated that three very destructive bugs had not been mentioned, namely *Ignoratio communis*, *Indifferentia generalis* and *Influentia politica*. For the two former, education and public discussion are the remedies. For the last the Reverend Abbe had no specific to offer.

On Friday morning a paper on Forestry in Nova Scotia, prepared by Hon. J. W. Longley, Commissioner of Crown Lands, was, in the absence of Dr. Longley, read by the Secretary. The quantity of land available



for lumbering purposes in Nova Scotia has never been, and is not now, large. The Province itself is small and a considerable portion of it has been cultivated and improved. In years gone by the Government was in the habit of granting land for lumbering purposes outright to lumbermen at 40 cents an acre, and the grant was absolute and conveyed the fee simple of the land to the grantee. Most of the large lumbering concerns hold their lands in this way. In 1899 a system of leases was adopted, the term being twenty years, and the dues 40 cents per acre where the timber to be cut was restricted to a minimum of ten inches in diameter, and 50 cents where a minimum of six inches was fixed. These fees were doubled in 1904. Conservative lumbering has given good results in Nova Scotia, where the growth of spruce appears to be rapid, but forest fires have caused great destruction. A Fire Act was passed in 1883, but was ineffective until a Fire Warden Service was established last year. The Act has been brought into effect in nine counties and in these municipalities no fire of any consequence occurred during the last season though it was an uncommonly dry one. The Act provides that no bush fire shall be set without previous notice to the Chief Ranger and with his consent, and this part of the Act is being cheerfully complied with by all persons clearing lands in these municipalities. The question of the possibility of special work in reforestation and the setting apart of forest reserves are two matters which are receiving consideration at present. The extent of ungranted forest land in Nova Scotia is 1,516,631 acres.

Mr. J. C. Langelier's review of the "Forest Wealth of the Province of Quebec," was an able and exhaustive one, to which no summary can do justice. Mr. Langelier divided the forest region into the northern district, lying north of the 48th parallel and the St. Lawrence and forming the most important forest area, the home of the spruce; the central district lying to the north of the St. Lawrence River, in which the white pine ranks first in importance; and the southern district, south of the River. Calculating the revenue from the timber on Government lands in these districts at \$420,000,000 at the regular rates of dues, Mr. Langelier gave a possible revenue of \$4,200,000 for one hundred years. All the forests of Quebec are accessible by water except

those in the Abitibi and Mistassini districts, and even for these Mr. Langelier sees an outlet by way of Hudson Bay to the prairies of the Northwest. The opinions of leading lumbermen were quoted to show the increasing value of all species of timber trees and particularly spruce. This is due partly to the demand from the United States, which is increasing and will undoubtedly continue to do so despite all calculations to prove the contrary. As to the time for which the present forests will last, a calculation is made which ranges from 25 years for hardwoods to 82 years for pine and 334 years for pulpwood. This does not take account of destructive or reproductive forces that may affect the consumption. Fire, indiscriminate settlement, unwise or unlawful cutting, waste in lumbering operations, the power of self-reproduction, and the extension of railways through the forest are in this respect factors of potent efficacy and deserving of the most serious consideration. If fire is allowed to continue its work of destruction, it will not be safe to extend the period for the duration of pine beyond fifty years. The spruce might last indefinitely if unfortunately the results that might be expected are not nullified by an irrational system of colonization, allowing settlement to take place in and destroy what are purely timber lands. The forest policy for Quebec Province at the present moment, as outlined by Mr. Langelier, is to protect the forests from fire and the inroads of timber pirates raiding the forest under the pretense of promoting colonization. All efforts should tend to organization against fire and the classification of our public domain into woodlands and farming lands with the view of securing free access to the latter by bona fide settlers. In the Province of Quebec in 1903 \$50,000 was spent to protect from fire public buildings worth \$3,000,000; \$20,000 was spent to protect fish and game, which yield a revenue of \$63,119; while, only \$17,000, part of which was paid by the lumbermen, was expended to protect the forests yielding a revenue of \$1,241,814.

On Friday afternoon a trip was made to the Montmorency Falls and was much enjoyed. Here, as elsewhere, the visitors were impressed with the fact that the ability to entertain is one for which the good old city of Quebec can still well sustain its old time high reputation.

In the evening, an illustrated lecture by Dr. Judson F. Clark, Forester to the Ontario Bureau of Forestry, on "The Forest as a National Resource," and a talk by W. H. F. Addison, of Yale Forest School, on "A Forest School," were given in Morrin College Hall, before a good audience. Mr. Addison gave an interesting sketch of the work done in a forest school. Dr. Clark's lecture was an able presentation of the influence and place of the forest in the national life, and the appropriate illustrations made still clearer his well-sustained argument for dealing with it on large and broad lines.

The election of officers resulted as follows:—Patron, His Excellency the Governor General; Honorary President, Aubrey White; President, E. G. Joly de Lotbiniere; Vice-President, E. Stewart; Provincial Vice-Presidents, Prince Edward Island, Revd. A. E. Burke; Nova Scotia, Hon. J. W. Longley; New Brunswick, His Honour Lieutenant-Governor Snowball; Quebec, Hon. S. N. Parent; Ontario, The Commissioner of Crown Lands; Manitoba, Hon. J. H. Agnew; Assiniboia, His Honour Lieutenant-Governor Forget; Alberta, Wm. Pearce; Athabaska, F. D. Wilson; British Columbia, Hon. H. Bostock; Secretary-Treasurer, R. H. Campbell; Board of Directors, J. R. Booth, Hiram Robinson, H. M. Price, Monseigneur Laflamme, Dr. Robert Bell, Dr. Wm. Saunders, Thos. Southworth.

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Thos. Conant, of Oshawa, Ont., an active member of the Canadian Forestry Association, died at his home on the 14th March last. Mr. Conant was well known as a writer, having published several works on pioneer life in Canada. He had done considerable experimentation in walnut tree culture on his property, and always took a warm interest in the work of the Forestry Association.

## FORESTRY IN RELATION TO MINING.

*By Professor J. C. Gwillim, School of Mining,  
Kingston. Ont.*

**T**HE forests of the present and future are likely to be found in the rough places of the earth, such places as mountainous districts and the rocky thin-soiled regions, which at least afford refuge and nourishment for the hardy conifers.

It is in such districts that mines are largely found. A natural condition, not a coincidence, associates metallic minerals with rocky and mountainous places. In such districts, often inaccessible and undesirable from other points of view, the mines alone make a demand upon the forests. As time goes on the more accessible forests will be cut out and replaced by permanent industries. The land so won will seldom revert to forest, or be planted with trees. The last resource of the lumberman will be in the awkward places, such as surround mining districts. Here the axe and fire of the mining industry will have largely forestalled him.

The mining operations spare nothing above a few inches in diameter up to two feet; they lay tribute to the surrounding hillsides for lagging, stulls and sawn timbers. These are placed in the mines to support operations temporarily; they quickly rot, collapse, and are of no more use. The mine itself on the average is of only a few years' duration. The miner having robbed the forests above and the mineral below passes on leaving the wilderness to mend his destruction.

The nomadic tribes of Siberia are reported to consider mining a sacrilege and insult to the earth. To hoist its mineral treasures to the light of day, while casting its green trees into the dark passages of a mine, does seem a violence to nature.

Considering for a moment the demands of a large mine, producing say 100,000 tons of ore per annum. The cost in timbers is from 5 cents to 30 cents per ton of ore in Canada, or about one to two lineal feet of 12 inch timber per ton. At one lineal foot per ton this would be one million two hundred thousand feet board measure. This demand soon denudes the adjacent forests and calls



for importation. The Rossland Mines of British Columbia, for instance, bring in Douglas Fir from the adjacent State of Washington, at a cost of about eight cents per lineal foot for suitable timbers.

The addition of a mining town, lumber for flumes, ties for railways and tramways, considerably increases the draft upon the forest; for the mining industry is in its nature seldom permanent; hence wood is used for almost all structures. The careless fires of the associated prospector consume large areas of the forest. This burnt and standing timber for a time is well adapted to mining purposes, being seasoned and light, but who can time forest fires to meet the demands of the mines? Thousands of miles of half-standing, half-fallen trees may be seen in British Columbia. This burnt-over ground is recognized as helping the prospector to find minerals by reason of the bareness left by such fires. The exceeding dryness of last summer in British Columbia added greatly to the burnt areas, the forests burning from the valleys up to the timber line.

A tax of even five cents per ton for timber is more than many of the great mines can afford, the margin of profit being so small. Many expedients are used to avoid timbering; the excavations are allowed to cave in, or are filled with waste rock, at less expense. Amongst the woods best fitted to withstand the rapid deterioration in mines are the conifers, especially the Douglas Fir of the Pacific Slope, the Spruce, Hemlock and Mountain Tamarac (*Larix occidentalis*). These are the principal timbers of the Canadian mountains and some of the Western States. The last is a very fine tree, often two feet in diameter, without limbs for fifty feet. It appears to reach its best westwards of the East Kootenay Valley.

The Douglas Fir of the Pacific Coast is exported to the South African mines, as also the Eucalyptus or gum tree of Australia, and the Kauri Pine of New Zealand. All of these mentioned are resinous trees, best suited for the short life and duty of mine timbers; artificial preservatives are rarely used. Peeling some months before use is sometimes done with good results, as at the Le Roi Mine.

The main supply of props used in the Bankhead coal mines, Alberta, is derived from burnt standing spruce and Banksian pine. This still affords good material after over twenty years without life, but much is fallen and completely rotten.

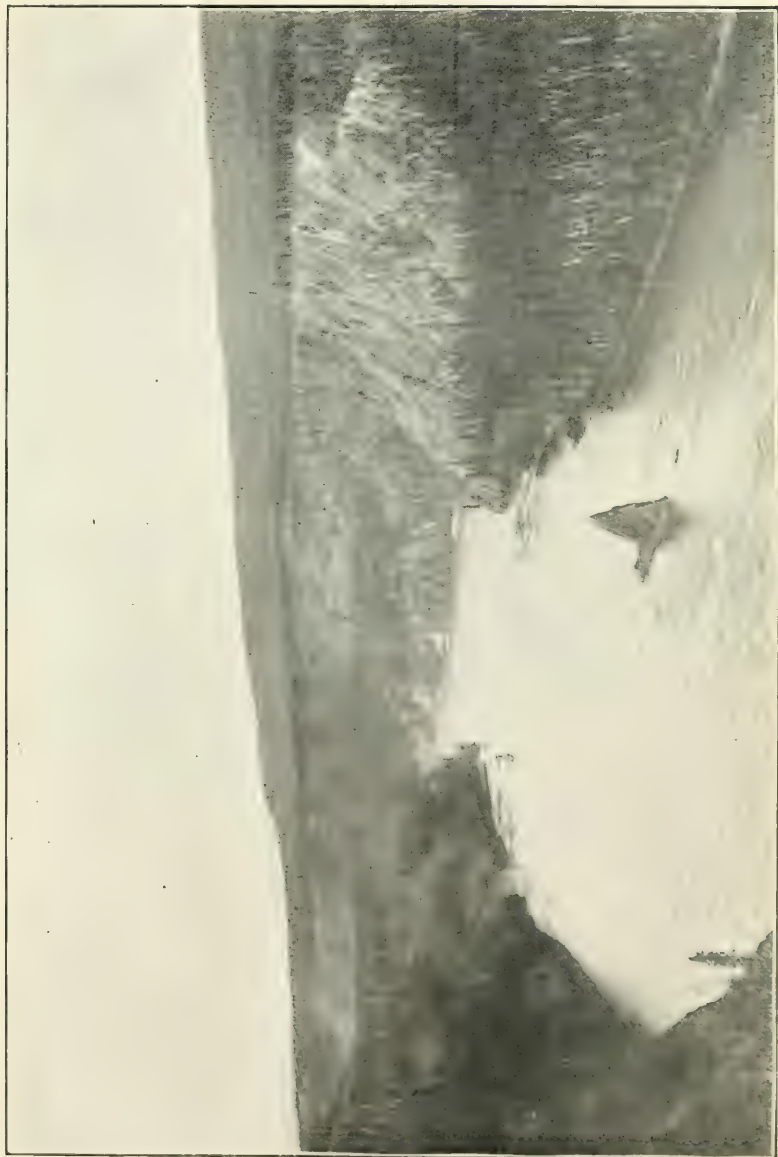
The Crow's Nest Collieries, B.C., are using up their burnt timber with economy, endeavouring as much as possible, to take the earliest burnt first, and use up each generation before it decays.

It is commonly stated that timber at the upper altitudes is apt to break short, to be brashy. This may be due to the less regular grain and growth at these places. Mr. E. R. Noakes, a mining engineer, at one time in charge of the Espirituo Santo Mine at Darien, gives countenance to the prevailing opinion in that country that the phase of the moon at time of cutting affects the rotting of mine timbers. The waning moon was considered most preservative.

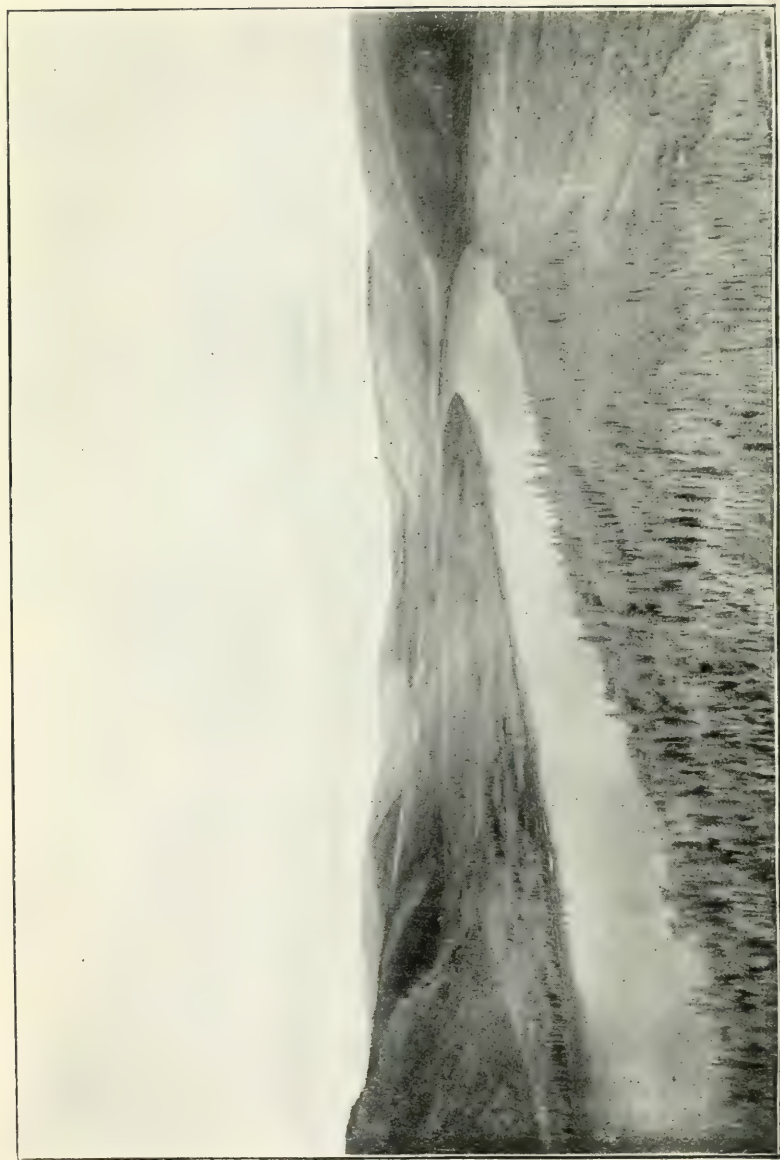
The conifers are naturally found in places where mining is also found. They furnish light, easily-worked material, and last as well as any need.

In the annual address of Mr. F. C. Whitman, the President of the Board of Trade of Annapolis Royal, the following statement is made in regard to the protection of the forests from fire:

"There is now a well established body of men under the supervision of a chief fire ranger in Western Nova Scotia; and the loss by forest fires this past year has practically been nil, as compared with an actual loss in our County of Annapolis in the previous year of \$150,000, and proportionate losses in other counties. There is to-day a marked increase in the values of timber lands, in part at least caused by the better protection now afforded."



Canyon on Belly River. Poplar and spruce on slopes and benches.



Pelly River. Groves of White spruce on Alluvial Flats.



## FORESTS OF THE YUKON TERRITORY.

By J. Keele, Geological Survey,  
Ottawa.

THE following note refers to that portion of the Yukon Territory, situated between the Pelly River on the south, and northward to the McQuestion River.

The forests of this district consist of only about eleven species which attain the dimensions of trees. These are the white spruce (*Picea alba*), the black spruce (*Picea nigra*), the balsam fir (*Abies subalpina*), the balsam poplar (*Populus balsamifera*), the aspen (*Populus tremuloides*), the black pine (*Pinus murrayana*), three species of birch and some species of willow. The varying conditions under which these trees grow greatly affect their size and distribution.

The white spruce is the most widely distributed and the most useful tree in the Yukon Territory. It makes a fair quality of lumber, which is used for various purposes by miners and prospectors. Huge quantities of white spruce are made into cordwood and piled at intervals on the banks of navigable rivers as fuel for steamboats. Thousands of cords in sixteen-foot lengths are floated down the Yukon, Stewart and Klondike rivers every autumn to Dawson to be used as firewood. The white spruce is seen at its best on the islands and alluvial flats of the main rivers, where they form fine groves of merchantable timber, easy of access to the lumberman. The size of its general growth on these flats is from eight to twenty-four inches, and individuals frequently attain a size of thirty inches in diameter at the butt, and logs sixty feet long, with a diameter of one foot at the smaller end, can be obtained. Up the slopes of the valleys, the white spruce, under favourable conditions, will continue to be a very fine forest tree. These conditions are, a sufficient depth of finely-divided loose material, and gentle slopes facing the direction which will allow the trees to receive the maximum amount of sunlight.

During the months of June and July the length of the day

over the district referred to, is from twenty to twenty-two hours, and the spruce in favoured situations, attain a considerable size, even at altitudes of 2,000 feet above the valley.

On slopes facing north and in the smaller and shaded creek-valleys and gulches, the spruce forest consists of poles from four to eight inches thick.

The black spruce is abundant on the swampy portions of the valley bottoms, and on moss-covered slopes facing northward. This tree has a tendency to fork at the top, and seldom grows to a large size.

At the headwaters of streams, i.e. the low broad divides, which are characteristic of portions of the district, the black spruce often forms large groves. This upland plateau country generally contains a few small lakes which are kept full by rills formed by the constant thawing of the ground during the summer months.

The pine of the district is not an important forest tree; it has a limited range and is much smaller than the white spruce, the general size being from four to six inches; it is seldom seen larger than nine inches in diameter.

It grows in thin groves upon the dry benches which border the Lewis, Pelly and MacMillan rivers, at a height of from forty to 300 feet above the streams.

The northern limit of the pine in the Yukon valley is at the mouth of the Pelly river, but in the country to the east of the Yukon, it extends farther north. From the MacMillan river it extends by way of Kalzas Valley northward towards the Stewart. North of the Stewart, small groves of pines were seen by the writer in the valley of Mayo river above Minto creek and on the shore of Mayo lake. This is the most northern occurrence that has been observed. The eastern limit of the pine was observed on the MacMillan river, about fifty miles up the south fork.

Next in importance to the spruce is the balsam; this tree is never seen on the river flats of low elevation, but occurs on high valley bottoms and on the mountain slopes. It seems to thrive best at an elevation of about 1,200 feet above the valley; it occasionally grows as large as eighteen inches in diameter. It de-

creases in size below and above this elevation, and becomes distorted and scrubby at tree line.

Between the Pelly river and the north fork of the McQuestion the timber line has been variously estimated at from 4,200 to 4,700 feet above sea level. In these localities the only tree represented was the balsam, the spruce generally disappearing a few hundred feet below.

In the Klondike district, timber line only reaches an elevation of 3,500 feet above sea level. The last tree seen here is the spruce, balsam being altogether absent.

The poplar (*Populus balsamifera*) grows on the islands and alluvial flats of the main rivers: it occurs mixed with the spruce, or in thin fringes along the gravel bars, and in small forest groves. It is seen in all stages of growth from a small shrub to a considerable forest tree. It gives out an agreeable and refreshing odour during the early summer: it is also known as the "balm of Gilead."

The aspen is specially characteristic of dry, open grassy hillsides facing southward, of which there is a great extent on the Yukon, Pelly and Stewart valleys.

The birch in the Yukon Territory never forms extensive groves, but grows singly or in small groups with the black and white spruce. Most of the birch is small, being mere poles, but one species (*Betula resinifera*) sometimes attains a diameter of eight or even ten inches and is valuable for stove wood.

The willow, being the principal food of the moose, rarely attains the size of a forest tree, but occasionally willow trees are seen in the neighborhood of old Indian villages.

In the spruce forests of the valleys, dry willow trees are found entangled in the living spruce in great quantity. These willows are often three or four inches in diameter and ten to twenty feet high. They evidently protected the spruce seedlings but were finally overshadowed by them. This supply of dry wood is of great benefit to the voyageur as it ensures a good camp fire in wet weather and during winter travel.

The most widely distributed shrub is the dwarf birch (*Betula glandulosa*), it grows densely on portions of the mountainous

slopes, and reaches above timber line. The miners call this shrub "buckbrush." The moose sometimes eat it when they cannot obtain willows.

Along the river banks the alder, willow and brier-rose are abundant.

Generally speaking, travelling on foot is easy through the forests of the Yukon. There is not the dense growth so often encountered in the north and east.

The thin growth is probably due to the permanently frozen ground just below the forest floor. The tree roots are unable to strike down, and the trees, as they grow taller, are compelled to buttress themselves against wind pressure by the spread of their roots. As the roots spread over the surface, only a limited number of trees can exist on a given area, and the weaker trees decay for lack of sufficient nourishment.

In the Klondike district, Professor Macoun has observed that trees on southward-facing slopes, at a height of 1,500 to 2,000 feet above Dawson, are not only better grown and larger but also have roots which strike deeper than trees of the valley flats. He explains that this is due to the sunshine not being cut off from this elevation by the hills on the opposite side of the valley as it often is on the valley bottom, and as a result of this a deeper layer of loose material is thawed out on the higher elevations.

Considerable forest fires occurred immediately after the influx of gold seekers in 1897 and '98, and since then fires have been frequent every summer. Most of the fires were due to careless and inexperienced campers; many are due lately to miners who take no precaution against the spreading of fire when clearing their claims.

A serious disadvantage on many gold-bearing creeks is the scarcity of water for mining operations. This is sometimes the result of burning the forest covering and moss on the headwaters and slopes above the stream, so that the moisture is no longer conserved and sent down the hillsides in a steady supply during the summer. Landslides sometimes occur on hillsides as a result of forest denudation, especially on slopes where the rock waste



or gravel has a matrix of clay. This material thaws out rapidly when deprived of its covering of moss and trees. When thawed to a certain depth, masses of the loose material are apt to slip into the creek bottom and interfere with mining operations.

Indians were apparently quite numerous in this district long before the coming of the white man. Vestiges of ancient camps are often met with in various parts of the district where there is not one recent sign. It is probable that the Indians burned large areas of forest for hunting purposes, for in the clearings thus made the moose is easily seen and stalked. The Indians are now few in number and hunt over very limited portions of the districts.

Early in September the leaves of the poplar, birch and willow turn to an almost uniform tone of golden yellow, and a simple colour scheme of green and gold continues for a few weeks.

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Mr. J. C. Hallman, of New Dundee, Ontario, writes urging that action should be taken by the Canadian Forestry Association to elaborate some system for remedying the evils of overclearing, which he states are so plain in Western Ontario, that people are getting alarmed at the situation, and are asking for remedies. Mr. Hallman has taken this for a subject at Farmers' Institutes for some years, and finds that a great deal of interest is taken in it and that it raises a great deal of discussion. He considers it the greatest question that older Ontario has to solve in the near future.

The Ontario Government, through the Agricultural College, are taking steps to meet this issue, but it is to be regretted that the larger problem of the lumber industry, has somewhat overshadowed this equally important one in the deliberations of the Canadian Forestry Association.

## CARE OF STREET TREES.

*Roland D. Craig, F.E., Dominion Forestry Branch.*

THE attractiveness of a town or city depends very largely upon the trees planted along its streets. They are among the first things which a stranger notices in formulating his impressions as to whether it is a good place to live in or not. One does not need to be a lover of nature to appreciate the refreshing shade of a row of trees along the sidewalk on a hot summer day, or the protection afforded from the cold winds in winter. What a relief and rest the weary eyes find in the verdure of a plantation of trees after the glaring pavements and shining windows of a bare street. Trees, by transpiring through their leaves large quantities of moisture and by the coolness of their own bodies, exert an important influence in reducing the temperature in summer. They also exert a beneficial influence by absorbing poisonous carbonic acid gas from the air, and giving in return pure oxygen for the use of man.

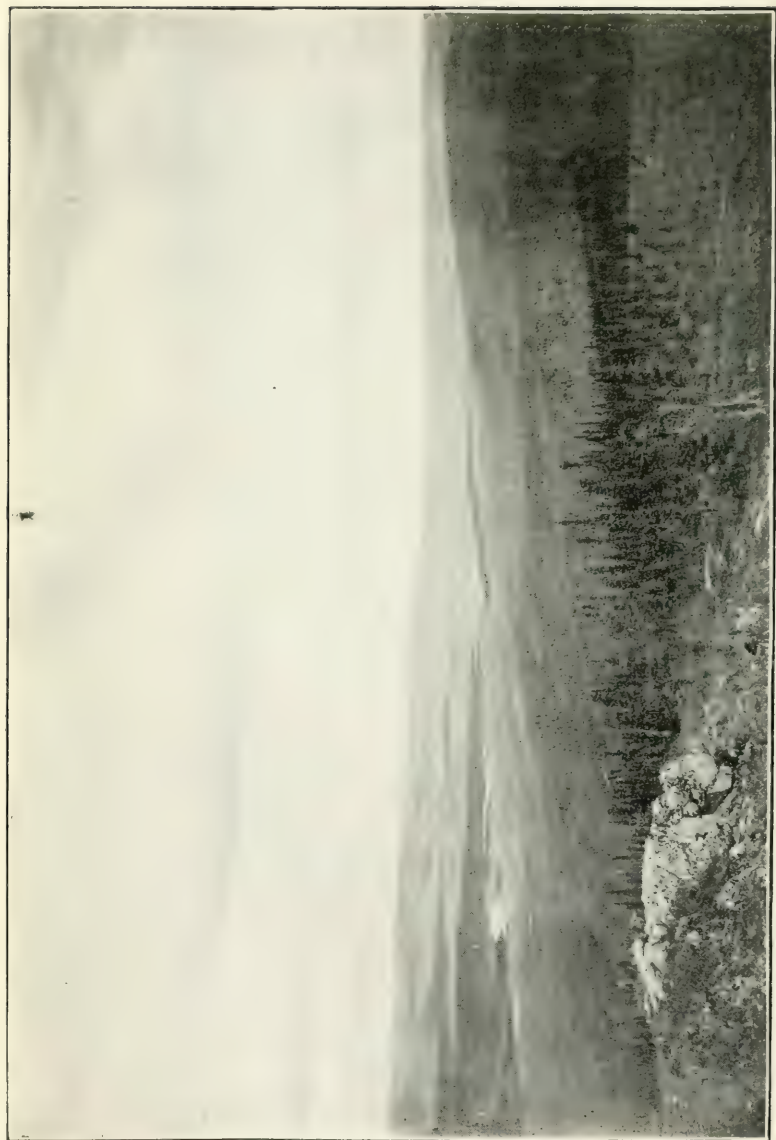
Though one of the most important factors in making the life of urban populations healthy and happy, the trees of our streets, as a rule receive very little consideration on the part of municipal authorities. In many cases the planting and care of the trees is left to the individual citizens, in front of whose property the streets run, and in few places are men trained in tree culture employed to look after this important work, and for this reason many well meant efforts result in failure. It is the object of the writer to point out briefly a few of the mistakes commonly made in the management of street trees, and to make some suggestions which may be of use to those who are interested in this work.

### *Lack of Uniformity.*

The appearance of many of our streets is spoiled by a lack of uniformity in planting, especially where it is left to the individual property owners. One man plants elms, the next maples, the next horse chestnuts and probably the next two none at all, so that all order and harmony is lost and it results very frequently in the slower-growing trees being suppressed by their neighbors



FIG. 1—A Mixed Row, showing different habits of growth of Birch, Elm, Ash and Maple.



.At tree line on hills near Stewart River



overtopping them. For the best landscape effect and for the best development of the trees themselves it is advisable to use only one species on a street.

Uniformity should also be secured in the distance apart at which trees are planted, and they should be as nearly as possible even sized. In Washington, they keep in the city nursery trees of all sizes, so that when one dies on the street it is replaced by one of equal size. This practice can be followed profitably only while the trees are comparatively small, as the transplanting of large trees is very expensive.

### *Selection of Species.*

In selecting species of trees for street planting regard should be given to their different habits of growth, light, air and water requirements. Where the streets are narrow, smaller more upright trees, such as the Norway maple or cottonwood should be selected; on wide streets, the tall elm, with its spreading crown, the sugar maple or the linden are better adapted. On high, dry situations species which require less water, such as the scarlet oak or horse chestnut, thrive better than elms or maples. The horse chestnut seems to withstand smoke and other injurious gases better than other species.

### *Selection of Planting Stock.*

It is of the greatest importance to secure thrifty well-developed stock for planting. Too frequently the young saplings are just dug from the woods, their roots chopped down to a convenient size, and the top cut back, so that the shape of the tree is spoiled for a time. Every tree which is to be planted on the street should be grown in a nursery and transplanted several times, so that the roots will be trained to grow in a compact form, before being finally placed on the street. In the nursery too, by judicious crowding, **straight, tall and clean trunks** can be developed, thereby lessening the amount of pruning necessary in after life.

### *Too Close Planting.*

One of the most common mistakes made in street planting is placing the trees too close together, so that their crowns do

not develop symmetrically and the vigor of the trees is impaired. Thirty to thirty-five feet is close enough to plant large trees, like the elm, hard maples and lindens; horse chestnuts, cottonwoods and box elders, may be grown closer together. It is sometimes advisable to plant quick-growing trees, such as the cottonwood or box elder, between the elms or maples, in order to fill up the spaces while these trees are young, and to secure the benefit of the shade as soon as possible. These trees should, however, be removed before they interfere with the permanent trees.

On paved streets the trees suffer greatly from lack of air and water, and it is advisable to leave at least three feet all around the base of the tree unpaved, so that air and water may reach the roots. Another thing to bear in mind when planting is to place the trees out of reach of horses standing at the curb. A great many of our trees are injured by horses biting off the bark or rubbing against the tree. It is better not only on this account, but on account of the larger feeding surface the roots are able to reach if the trees are set between the sidewalk and the private grounds rather than outside the sidewalk. Until the trees are 8 to 10 inches in diameter, they should be protected by wire tree guards.

### *Pruning.*

Pruning is a necessary evil in the care of street trees. On the street trees are in an unnatural environment, and with the abundance of light and air tend to develop too much crown for the usually scant plant food supply. The liability of these more or less isolated trees to injury from snow and ice pressure and from wind, also makes it advisable to so guide the growth of the crown that there will be as little danger from these sources as possible. With this in view it is wise to preserve well defined central axes in trees like the birch, maple and ash, which naturally possess such and in the elms, which normally assume a vase form, large horizontal branches should be prevented from developing and the crown should be supported by three or four main branches grown as nearly vertical as possible.

### *Start Pruning Early.*

Pruning should be commenced when the tree is young and the branches small, so that the necessary amputations will be small.

Heavy pruning, such as shown in Figs 2 and 3, seldom results in anything but a brush-heap of a top or a stunted and weakened tree.

### *Leaving Stubs.*

The most pernicious practice in pruning as it is usually done is the leaving of short stubs of branches, which, deprived of communication with the leaves, die and remain as decaying plugs of wood in the trunk, from which rot soon spreads to the heart of the tree, and not infrequently results in the death of the tree. All amputations should be made flush with the wood of the stem so that the wound can be readily grown over with new wood, and the surface should be perfectly smooth to prevent water carrying disease germs from lodging in the irregularities and starting decay. The danger from decay may be almost entirely eliminated by applying a coat of coal tar on the wound immediately after the cutting. This disinfects the surface and prevents water from soaking into the wood. Other substances, such as white lead or ordinary paint may be used, but coal tar is much the best.

When heavy pruning is necessary and it is desirable to guide the branching by leaving short branches, as in Fig 3, small leaf bearing branches, called sap-lifters, should be left at the end of the stub to keep up the circulation of sap and thereby prevent the death of the stub.

### *Time for Pruning.*

Pruning, if carefully conducted, may be done at any time of the year, but in the fall after the leaves have fallen is the best time as a rule. At that time it is easier to see the arrangement of the branches. You secure also the full season's work of the leaves in storing up food material, and all the benefit of the rapid spring growth in healing over the wounds and in the production of desirable branches.

### *Treatment of Decayed Spots in the Trunk.*

The life of a tree may often be saved even when decay is quite well advanced by first removing carefully all decayed wood, then painting the surface with coal tar to disinfect it, and if there is a cavity it should be filled up with cement, much as a dentist

would fill a tooth. The wound will as a rule heal over, enclosing the filling, and the tree will be practically as healthy as ever. This practice is followed in treating the live-oaks in California with great success.

### *Cleaning.*

All dead branches should be removed without delay for, if left on the tree, they act as centers from which decay will spread.

To recapitulate what has already been said—plant uniformly with good thrifty nursery stock of the species best adapted to the situation; plant the trees far enough apart to enable each tree to reach its highest development; prune systematically and carefully, paying particular attention to the removal of all stubs and dead branches which are liable to act as starting points for decay; disinfect all wounds with coal tar.

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The following note is from the *American Forestry Quarterly*:—

Austria's total forest area is about 24,000,000 acres, of which hardly eight per cent belong to the State, but altogether over 10 per cent. are under State administration. Private forests comprise over 14 million acres, and the remainder is owned by communities and institutes. The proportion of coniferous, deciduous and mixed forest, is about as 6 to 2 to 1.8. The average annual accretion is 46 cubic feet per acre for the timber forest, with 20 per cent. work wood. 3,571 foresters and 27,000 rangers are employed. Day wages for men at planting work vary from 24 cents to 80 cents in one region, from 65 cents to \$1.25 in another region. In Austria, besides a great variety of wood consuming factories, there are over 61,000 sawmills and 253 pulp mills. the latter using over 400,000 cords of wood.





FIG. 2—A Young Maple—The form has been spoiled and the life blighted by careless cutting of the main stem.

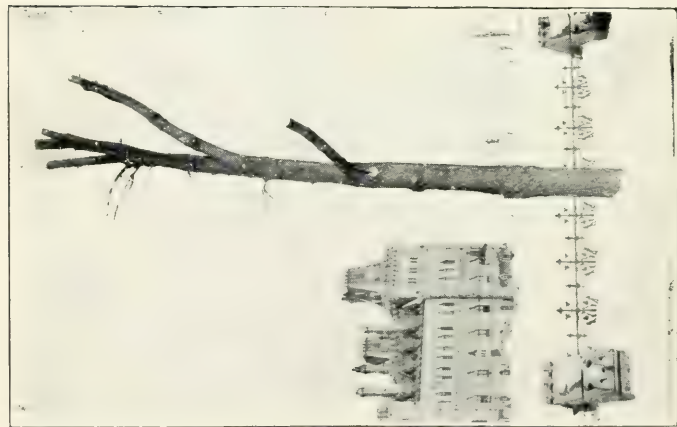


FIG. 3 — Elm pruned too severely. The life is endangered by leaving stubs of branches.

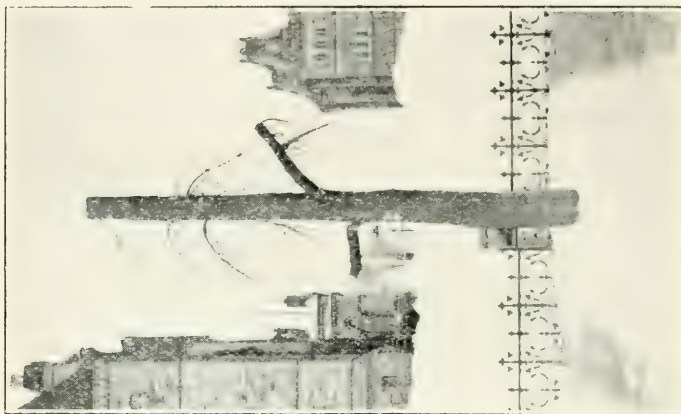


FIG. 4 — Elm pruned too severely. The form is permanently spoiled.

## THE AMERICAN FOREST CONGRESS.

**T**HE Forest Congress held at Washington, 2nd to 6th January, 1905, is one of the most important steps in the history of the forestry movement in the United States which has been taken in recent years, and its significance is well summed up in the following paragraph from the address of the President of the United States, at the session held in the National Theatre, on Thursday afternoon:—

“The great significance of this congress comes from the fact that henceforth the movement for the conservative use of the forest is to come mainly from within not from without: from the men who are actively interested in the use of the forest in one way or another, even more than from those whose interest is philanthropic and general. The difference means to a large extent the difference between mere agitation and actual execution, between the hope of accomplishment and the thing done. We believe that at last forces have been set in motion which will convert the once distant prospect of the conservation of the forest by wise use into the practical accomplishment of that great end; and of this most hopeful and significant fact the coming together of this congress is the sufficient proof.”

The delegates, to the number of about four hundred, came from all parts of the United States and Canada also had a good representation. There were present scientific and literary men, business and professional men, those interested practically and those whose interest was theoretical, and ladies also were noticeable in goodly numbers.

The attendance at the sessions of the Congress was well sustained throughout, the hall of the Armories, which will seat an audience of four hundred, being filled on all occasions. The special features of the programme, which illustrate the above quoted statement from the President, were the addresses and papers from leading lumbermen, railroad representatives, mining engineers and other prominent business men.

The opening Session was presided over by Hon. Jas. Wilson,

Secretary of Agriculture, in whose Department the Bureau of Forestry is located. Mr. Wilson, as President of the American Forestry Association, by which the Congress was convoked, gave the delegates a hearty welcome, and pointed out the great significance of the Congress, a body of men representing great and varied interests, gathered together to discuss temperately and far-sightedly the policy and the methods under which the highest permanent usefulness of the forest can be maintained. As Mr. Wilson pointed out: the extension of railroads, the settlement of the public domain, the building of cities, towns and villages, the use of wood in paper making and the opening of the mines call for more wood every year, and the forests respond to the demand. There are only a few large reserves left from which to draw supplies. The extreme east, the extreme west, and the Gulf coast are now the sources of commercial supply. The industries of the country will be carried on at greater expense as wood becomes scarcer, and the substitutes become dearer. Agriculture, commerce and mining will greatly miss the cheap supply of wood to which they have been accustomed.

The Report of the Board of Directors of the American Forestry Association, presented at this Session, gave a resume of the present position of forest legislation in the United States, and some points may be noticed particularly with such additional explanations as may be necessary to make the subject clearer to Canadians.

The Forest Reserves of the United States now number sixty-one, and embrace a total area of 63,348,656 acres. The policy of selling the mature, dead and down timber in the reserves, has been adopted, and during the past year 377 sales were held, realizing \$58,000. These sales, combined with the privilege allowed settlers to take without cost, for their individual use, timber from the Forest Reserves for domestic purposes, have resulted in clearing the reserves of much dead and down timber, and in every way improved their condition. The forest rangers in the reserves have done excellent work in preventing fires. The grazing privileges in the Forest Reserves are of special value in the west, especially where sheep are grazed, and where the highlands included in the reserve are required for summer range. Excessive



numbers of sheep and careless methods of herding had done much injury to the forest lands, and the matter is now controlled by permit, no stock being allowed to graze in the reserves except by special authority from the General Land Office. Last year 843 permits for 1,806,722 sheep were granted on twenty reservations, and 5,822 permits to graze 610,091 cattle and horses in 43 reserves.

A peculiar feature of the administration of the reserves is that the survey work is carried out by the Geological Survey, the control of the lands is in the General Land Office, while the forest experts are in the Bureau of Forestry. The latter Bureau can assist in the management of the reserves only as called on by the Land Office. Consolidation of the administration is therefore urged, and a resolution supporting it was passed by the Forest Congress. This has since been carried into effect by Congress.

The administration by the Federal Government of forest lands which have not been included in reservations has never been placed on any logical or sound basis. In 1831 Congress made it a felony to cut or remove timber from public lands without due permission, but homesteaders had the right to use the timber on their land for domestic purposes, and miners had the same right for individual necessities. Timber dealers who trespassed were required, if detected, to pay stumpage or the timber was seized. In 1878 came the much-quoted Timber and Stone Act, by which timber land unfit for cultivation or land valuable for stone only, in California, Oregon, Nevada and Washington, might be sold to citizens at \$2.50 per acre, but not more than 160 acres to one individual or company. It was also provided that timber or mineral lands might be taken for domestic purposes by residents in Colorado, Nevada, New Mexico, Arizona, Utah, Wyoming, Dakota, Idaho or Montana. The Homestead Act provides for a free grant of 160 acres after five years' residence, but this may be commuted at the end of six months on proof of residence and cultivation and the land purchased at the legal rate. There being no direct method for the lumberman to obtain the timber the two acts mentioned were used for this purpose, and of necessity resulted in fraudulent methods, the employees of the lumber firms and others being used as dummies.

The report urged the consolidation of the forestry work in the Bureau of Forestry, and the repeal of the Timber and Stone Act, with the substitution of an Act providing for the sale of timber by public competition.

After the preliminary business of the first morning's session was disposed of the Congress took up the consideration of the Importance of the Public Forest Lands to Irrigation. In the Western States, as in part of Western Canada, there are large tracts of land that depend for their agricultural possibilities on a supply of water for irrigation, and the sources of supply in the Sierras and the Rocky Mountains are largely controlled and regulated by the forests growing upon them. This intimate relation is felt by the people of the West, and the subject was introduced by the Secretary of the National Irrigation Association, who voiced an urgent demand that the wholesale destruction of timbered watersheds should be prevented, and that action should be taken to reforest lands where the value of the water supply would warrant such a step. Another question of interest to the West was grazing in relation to the forest reserves which was dealt with by representatives of the Stock Association. Cattle and sheep are allowed to graze in the forest reserves under permit and special instructions. Investigation of the ranges has shown that damage caused by live stock is usually due to over-stocking, grazing too early in the season, or the manner in which the stock is handled, all of which can be directly charged to the previous lack of any system of management rather than to the sheep and cattle.

The Lumber Industry and the Forest, the next subject brought before the convention, was given over into the hands of the lumbermen and the Lumber Associations. Three lumber companies were represented by their Presidents or Vice-Presidents in the list of papers presented, and as many of the Lumber Manufacturers' Associations were also heard. This session was presided over by Mr. N. W. McLeod, President of the National Lumber Manufacturers' Association. From all came a strong declaration of the interest of the lumbermen in forestry, and at the same time a statement that this had not always been their attitude. The change has been due to two causes specially. First, to a clearer understanding by the advocates of forestry

methods of the elements, and especially the economic element, involved in forest management and consequently a more sympathetic attitude toward the lumberman. And, second, the increased value of forest products and timber stumpage, impressing upon the lumbermen that all the value of his timber holding does not rest in the present, but that it is to his advantage to take measures to preserve and perpetuate the forest. The lumbermen are therefore desirous of obtaining all possible information which will assist them in attaining this end, and are prepared to receive light from foresters or from any other source. The supply of hardwoods for manufacturing purposes is also giving the manufacturing establishments concern and they too added their voice in urging consideration of the future resources.

The Railway Companies had the floor on Thursday morning under the Chairmanship of Mr. Howard Elliott, President of the Northern Pacific Railway Company, and three of the papers were by representatives of other railway companies. The railways use large quantities of timber in connection with the equipment of their lines, their total annual consumption for the United States being probably three billion feet, which would mean the denuding of about one million acres or the annual product of fifty million acres. Ninety million ties are required annually. The railways see the sources of supply steadily diminishing, while the prices and their requirements are as steadily increasing. They therefore ask the question: How can the demand be met? The Pennsylvania Railroad has made an attempt to answer it by planting trees along their right of way and other lands held by them. The situation may also be helped by preservative treatment to increase the life of the timbers used. This may mean a doubling or quadrupling of the period of use of a tie, while the addition to the cost is small. A red oak tie lasting five years and costing forty cents, may be treated at a cost of sixteen cents, so as to double its life and make it equal to a white oak tie, costing, untreated, eighty-five cents. Experimental work in this line is being done by the Bureau of Forestry.

In addition, the Relation of Forestry to Mining was considered, and thus the practical and business aspects of forestry and its relation to other great industries were discussed and empha-

sized by the representatives of these industries. It was a significant fact of the Congress that leading men in railway organization, in lumbering and manufacturing enterprises, were prepared to come to such a meeting and give time and thought to the consideration of the forest supply, and showed more clearly than anything else could do the demand and the reason for the movement which the Congress represented.

The meeting held in the National Theatre, which was presided over by Hon. Jas. Wilson, was an effort to reach a wider constituency than could be influenced by the regular meetings of the Forest Congress. An address by President Roosevelt was sufficient to attract an audience that filled the theatre. The President is not an orator, but he is a clear, forcible speaker, evidently earnestly seized with the importance of the question with which he is for the moment dealing and desirous of driving its truth home to the minds of his hearers.

"The producers, the manufacturers, and the great common carriers of the nation had long failed to realize their true and vital relation to the great forests of the United States, and forests and industries both suffered from that failure. But the time of indifference and misunderstanding has gone by."

"No man is a true lover of his country whose confidence in its progress and greatness is limited to the period of his own life, and we cannot afford, for one instant, to forget that our country is only at the beginning of its growth. Unless the forests of the United States can be made ready to meet the vast demands which this growth will inevitably bring, commercial disaster is inevitable."

"If the present rate of forest destruction is allowed to continue a timber famine is obviously inevitable. Fire, wasteful and destructive forms of lumbering and legitimate use, are together destroying our forest resources far more rapidly than they are being replaced."

Such were some of the statements in which the President expressed his views of the situation. But the anomaly, at least to those used to a British form of government, is that, no matter how strongly the executive may consider a certain course advis-





THE FRASER RIVER. B.C.



able, it does not necessarily follow that that will have any effect on legislation, and in fact in regard to the defects in the organization of the forest service and in the forest laws that urgently require remedy, the government is helpless until Congress is prepared to act.

M. Jusserand, the French Ambassador, at this meeting, gave one of the best addresses of the Congress. He described the forest as the great friend which supplied the early wants of mankind, giving the first fuel, helping to the rearing of the first real house. And, now, after the lapse of thousands of years, the forest continues the great friend, so adequate is it to our wants. The forest has proved itself a friend to France in reclothing the bare and wasted mountain sides and rescuing the fertile lands of the valleys from destruction, in restraining the destructive power of the winds, in stopping the advancing flow of that great sea of sand from the ocean, which engulfed farms and towns and threatened to make the country a desert. To quote M. Jusserand's own words:—

"The importance of such plantations (i.e. forest plantations on mountain slopes) is more and more apparent. We see destruction and poverty invade the parts where they have not been observed; wealth and comfort grow in those where the rules have been observed. Where there is a just proportion of forest ground, the temperature is more equal, the yielding of water springs more regular, and observations in the south of France have shown that, since the Esterel has been reforested the destruction caused by that terrible wind, called the Mistral, has diminished. The sea coasts of France were being gradually invaded by the sand, and the wind carried the death powder farther inland as years passed on. In 1810 we tried forestry, and the forest showed itself, as usual, the friend of man; the sand country has entirely disappeared, as well on the ocean as on the channel, and the desolate regions of yore are now wealthy, pleasant ones, where people even flock for their recreation and their health."

The size of the Congress resulted in one defect, that it was difficult to carry out a discussion of practical problems. This was partly met by a series of lectures to forestry students, follow-

ing the week of the Congress, and by other smaller conferences, two of which were held at the Shoreham, the headquarters of the Canadian delegates. The disposal of slash after lumbering operations, was one of the questions discussed. Mr. Pinchot stated that from investigations made in the Cache Lake Reserve the Bureau of Forestry had found that the burning of slash could be done at 25c. a thousand. Dr. Schenck, however, pointed out that with a stand of 5,000 feet to the acre, this meant for an area of 200,000 acres an expenditure of \$250,000, which was equal to an annual expenditure of \$14,000, and he therefore concluded that it would be better to put the money into providing a fire preventive service. The expense and the danger from careless handling of the fire seemed, in the general opinion, to render this method of disposing of the slash inadvisable, though the question was still left an open one. In California slash burning is viewed with favor. A delegate from that State mentioned, that on one tract of 30,000 acres, where cutting had been carried on for eight years, the slash had been burned along the road, or on about 1,000 acres, at the rate of 12 cents per acre.

Canada was well represented at the Congress, those present being Dr. Robt. Bell, Professor John Macoun, Dr. Jas. Flemer, E. Stewart, Norman M. Ross and R. H. Campbell, Ottawa; Aubrey White, Dr. Judson F. Clark, Dr. A. T. Drummond, J. H. Faull, Toronto; G. Y. Chown, Kingston. Professor W. N. Hutt, now of Maryland Agricultural College, formerly of Toronto, was also present. Mr. White addressed the Congress at the opening session, giving greetings from Canada, and explaining the methods of timber administration in the Dominion. Mr. Stewart also spoke of the forestry work in the West and invited members of the Congress to attend the annual meeting of the Canadian Forestry Association to be held in Quebec.



## GROWING DEMAND FOR FOREST TREE SEEDS.

THE Forestry Branch of the Department of the Interior has frequently been asked by nurserymen, both in America and Europe, and also by private individuals, as to where various forest tree seeds can be purchased in quantity in Canada.

The Canadian white pine is becoming more and more widely planted in European forests, greatly increasing the demand for this kind of seed. The quality of the American seed seems better than of that gathered in Europe and is believed to produce stronger and healthier stock. The jack pine (*Pinus banksiana*) also seems to be in great demand during recent years, the seed in Europe selling for a very high price compared to that of other conifers.

The seeds of both these varieties can be secured with little trouble, and the demand seems to be rapidly increasing, both at home and abroad. One German firm writes that they require annually from one to two thousand pounds of white pine seed, the price paid per pound, cleaned, being generally 50c. An American nurseryman also makes enquiry for 200 pounds of the same seed.

The usual method of obtaining seed from the thinner-scaled cones such as white pine and white spruce, is to gather the cones just as soon as the seed is ripe which can be determined by cutting open the cones. If ripe, the seeds will be filled with firm, white meat. The seed is generally ripe some weeks before the cones appear to be so, and if left too long is liable to be lost, as on hot days the scales open as soon as they become dry and allow the seed to drop out.

After the cones are picked they should be spread out in the sun, when they will gradually open. This process is hastened if the cones are put under glass frames similar to those used on hot beds. The seed is easily extracted by vigorously agitating the cones for a few minutes. The seed is finally cleaned by separating it from the wings by passing it through a kind of fanning mill.

The cones of Banksian and other thick-scaled pines require a considerable amount of heat before they will open sufficiently to permit the escape of the seed. The jack pine cones have to be subjected to a heat of from  $120^{\circ}$  to  $140^{\circ}$  Far. for from two to four hours, when the seed can be easily shaken out.

There seems to be an increasing interest throughout Canada and the United States in the matter of forest plantations; which is bound to create a market in the near future for all classes of seedling forest trees. There is no better source from which a supply of these seeds can be obtained than Canada. All the varieties which are of most economic value are native here, and from the geographical situation of the forests, Canadian seed should produce a much more desirable quality of stock than can be raised from that collected farther south.

It will without doubt pay our Canadian seedsmen to devote some attention to this branch of the seed business, which if carried on under a proper system, should develop very rapidly, especially in connection with supplying the demand in European countries.

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This season an important extension is being made to the work of the Forestry Branch, by commencing a systematic study of the forests in the Dominion Forest Reserves. This summer a field party, under the supervision of Mr. R. D. Craig, will be at work in the Turtle Mountain Forest Reserve, and probably later in the season in the Moose Mountain or Riding Mountain Reserve. The object is to ascertain the extent of forested and burned areas, the quantity of standing timber, and the silvicultural characteristics of the various species of trees found there. This latter will include a study of the rate of growth by stem analyses, and a study of the reproduction under different conditions of soil, exposure, seed trees. It is expected from the data collected to be able to establish regulations for cutting so that the forests may be improved rather than destroyed by use.

## NOTES.

Mr. Geo. D. Mendell, of Victoria, Australia, writing in the Bendigo Independent, makes an urgent appeal to the Australians to take up the question of forest preservation. Mr. Mendell visited Canada recently and evidently has a high appreciation for what has been done here, as he holds Canada up to the admiration of Australia as a shining example of progress and intelligent foresight. As it is rather pleasant to be represented in this role and it may strengthen the interest in the question of forestry to know how others look upon what we are doing, a few sentences from the article may be noted. Mr. Mendell says:—

“It is only about six years since the Canadian Government woke to the fact that one of its most valuable assets, its timber, was being prodigally wasted. Ever alert to the possibilities and future of trade, in which respect Canada imitates America and supplies Australia, and especially Victoria, with an admirable object lesson, the Government established a Forestry Department and passed laws to make its work effective. The Canadians regard forestry as the foster mother rather than the handmaiden of agriculture, and the puzzle to the observer, unconnected with either science, at first sight is that forestry is not considered the equal, the peer of agriculture, and just as carefully studied in an agricultural community like Victoria.”

Mr. Mendell also refers to the Canadian Forestry Association, and urges the organization of a similar society in Victoria.

“There are, as you know full well, two great classes of forests and no more. There is the wild forest and there is the civilized forest. People who know forests only through books, I mean through bad books, not the books written by members of this assembly, fancy that the wild forest is the thing. A time was too when people thought that the wild man, the man in a state of nature, was a nest of virtue and that, leading a kind of simple life, he led also, of necessity, a model life. The truth is quite

different; virtue, like all plants of price, needs cultivation; forests need the eye, the mind and the heart of man. Instead of being full of the most beautiful and useful trees the wild forest offers a prodigiously small quantity of good trees; many have outlived their period of use and they prevent the growth of others; many have grown crooked; wicked ones have injured the righteous."—*M. Jusserand, at the American Forest Congress.*

---

At a meeting of the Western Horticultural Society, held at Winnipeg, on the 24th January last, the following resolution was passed:—

Resolved that this Society desires to express to the Honourable the Minister of the Interior its approbation of his work as shown in the creation of a Forestry Branch in connection with his Department.

Also desires to express its conviction that the educational work carried on in the encouraging of tree planting has been of great value in helping the settlers to build for themselves comfortable homes.

And further, that the demonstrations made by his officers of the possibilities of tree culture on the great plains of Western Canada will render even more inviting to the prospective settler the fertility of the soil and also convince him of the healthfulness of the climate.

---

The *Canada Lumberman* has reached its twenty-fifth anniversary and celebrated the event by the issue of a special number, giving a history of the development of *The Lumberman* and the lumber industry since it began its career. In its initial number in 1880 it stated its objects, in addition to the furnishing of trade information, to be as set out in the following quotation:—

"Canada is indeed a wooden country, but its woods are fast disappearing, and one of the prime elements of its early growth is being ruthlessly destroyed by the old style of management on the part of the Government and the reckless indifference of the people. It will be the duty of *The Lumberman* to point out the



injuries annually inflicted on the wooden wealth of Canada by reckless tree felling, and the still more reckless starting of forest fires, whether by sportsmen or settlers. Even in the latter particular our journal may, by assisting in arousing public opinion, be the means of saving millions of dollars to the country in a single year."

The Lumberman has lived to see and assist in the formation of a better public sentiment on this question, and great improvement in the methods of administration. The Lumberman has shown itself progressive and broad-spirited and that it has the support generally of those interested in forestry and the lumber industry is shown in the assistance given by those who prepared the many able articles that appear in the special issue. The Canadian Forestry Association is indebted to The Lumberman for support and interest in the forestry movement and may well offer all good wishes for continued prosperity and expanding usefulness.

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"*Canada First*," is the name of a new magazine representing the Canadian Preference League, which began publication with the present year. The objects of the League are to give practical preference to Canadian goods and Canadian institutions, to foster the growth of Canadian sentiment, and to educate public opinion in this direction in every legitimate way. Naturally the Canadian forest is a subject of premier interest to a league formed with such objects, and it is considered in a well-written article on "Canada's Forest Wealth." The subject is dealt with in a sane and discriminating manner, and in this and other respects the magazine is a credit to and should be of great assistance in the advancement of the objects of the league.

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Following is an extract from an article on "The Climate of Manitoba and the Northwest Territories," by R. F. Stamp, Director of the Dominion Meteorological Survey:—

"In Manitoba the rainfall is greater than in any portion of the Northwest Territories. The normal annual precipitation for the Province is approximately 22 inches, and the May and August

rainfall 11.5 inches; drought is therefore not much to be feared here but westward the danger increases. From Regina westward to Medicine Hat and northward to Saskatoon, there are very few rainfall records of over a few years, but there is fair evidence that the average annual precipitation over this area nowhere exceeds 15 inches, and at many points is less than that amount. By reference to the table it will be seen that the records of 18 years indicate an average rainfall of 11 inches in Saskatchewan, and 12 inches in Alberta, which, with a snowfall of about 55 inches, gives a total precipitation of 16 or 17 inches over the larger part of Saskatchewan, and 17 or 18 inches in Alberta. But it is to be remembered that the seasonal precipitation in the far west is very variable. At Calgary in 1892, the total precipitation of the year was but 7.91 inches, while last year it was 34 inches. For five years the rainfall has been ample in this region, but for many years prior to 1897, it was scant, and in several of the years irrigation appeared necessary for successful crops. We may fairly assume that there will be a return to the dry conditions, and that the Government is acting in a most judicious manner in providing for irrigation in parts of Alberta.

“The writer is of the opinion that the Chinook has played an important role in producing a treeless prairie land in Southern Alberta and Assiniboia, and that the tendency for wooded lands in Northern Alberta, and northward, is largely due to the diminishing frequency of the Chinook with increasing latitude. The effect of the Chinook in Southern Alberta and Assiniboia is to keep the prairies almost bare of snow during the winter, and to leave it quite bare during the early spring, while farther north, as the Chinook is less frequent, the snow lies deep in winter, melts and waters the ground in early spring, providing moisture for trees at a time when moisture is most beneficial. Observation appears to warrant the statement that rainfall is much more variable near the mountains than it is farther east, also in southern portions of the Territories than in northern portions. In the Territories north of Edmonton, values of rain and snow have been deduced from between 6 and 10 years observations, and from these it appears probable that the normal precipitation throughout Alberta and northward into the Mackenzie River basin is not very differ-

ent except that in the higher latitudes the proportion of snow is greater."

---

The following extract from the report on the Botanical and Afforestation Department of Hong Kong is of particular interest, as showing the value of a systematic policy in the matter of reforestation:—

The time has now arrived for the colony to profit to the full extent by the foresight of the Government of a former generation.

In the late seventies tree planting was seriously undertaken, and from the year 1882 to 1885 the annual expenditure of \$12,000 was expressly sanctioned for afforestation, and from 200,000 to 300,000 young pines were planted each year. As the island became more completely covered with plantations, the operations and annual votes gradually diminished, until the present time, when the planting of a few thousand trees can be covered by a small portion of the tree-planting vote of \$3,450. As a result of this policy there are now nearly 5,000 acres of pine upon the island, and the oldest plantations, now between twenty and thirty years old, are ready to fell and replant.

The pine plantations are of very various ages and sizes and much time has been devoted during the year to a careful examination of them and subsequently to delineating them on maps and schedules so that a systematic working plan can be drawn up to ensure, as far as possible, a uniform annual outturn of timber. The surface of the island has been divided for this purpose into seven main divisions, and each of these into six to eight blocks, containing from 50 to 300 acres of pine plantations each. The primary object of this preliminary inspection of the plantations was to obtain statistics upon which to found a working plan for the future, but the results have a further interest as showing what return the Government have for their outlay of former years.—*Agricultural News, Barbadoes.*

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Hon. A. B. Warburton in a letter to the Charlottetown Patriot, writes in regard to the failure of the hay and straw crops

in 1904, and ascribes the failure mainly to the bare, unprotected state of the meadows and grain fields. The woods have been cut away to such an extent that the fields are exposed to the full force of the sun and of every wind that blows, and the question is asked whether or not the failure of the past year is not in the main to be found in this very fact, that the unprotected lands were dried by the spring and early summer winds. One farmer told Mr. Warburton that the only good field of hay he had was one at the back of his farm which was well sheltered by woods and that those not sheltered had been almost complete failures.

Though the subject requires fuller investigation the influence of sheltering trees on moisture conditions are very noticeable. To quote but one instance of many recently cited in *Forestry and Irrigation*, from the results of experiments made by the Agricultural Experimental Stations in Wisconsin in 1894: to the leeward of a piece of black oak woods, of an average height of 15 to 25 feet, the results showed an evaporation at one foot above the surface of the ground varying from 11.1 cubic centimetres at twenty feet from the grove to 18.5 cubic centimetres at 300 feet, beyond which distance the amount remained constant. The observations were made during an hour of sunshine in the middle of the day. Thus at 300 feet the evaporation was 66 per cent. greater than at 20 feet.

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Mr. T. M. Robinson writes from Gravenhurst, Ontario, as follows:—

“ There are millions of acres in Muskoka and this back country that are useless for agriculture, over which second growth timber is asserting itself, and which would in a few years, if suitably protected, prove to be of great value to the country. The protection of the new growth of trees is a duty devolving upon not only the legislators of Canada, but also upon the present generation of Canadians, who have reaped such a large harvest from the woods of their country.

“ It is safe to say that in the forty years that I have known Muskoka, the white pine has receded two hundred miles, with practically no effort to protect the second growth. I am pleased to



be able to say however that there appears to be a gradual awakening to the importance of this question, even when least expected, for recently in a gathering of ordinary settlers, the conversation turned to the growth of white pine over burned land, and it was of great interest to listen to the testimony of those present, who had begun to observe the rapid growth made after the first ten years. I consider the outlook more hopeful and every effort should be made to spread the knowledge of the subject of forestry."

---

Copies of the proceedings of the American Forestry Congress, held at Washington, during the first week of January, may be obtained from H. M. Suter, the Secretary of the American Forestry Association, whose address is 500 Twelfth St., N.W., Washington, D.C. The price of the report, bound in cloth, is \$1.25, and five or more copies will be sent to one address for \$5.00 each.

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Among the recommendations of the American Forest Congress, was one suggesting an amendment to the Homestead law, requiring the planting under the supervision of the Forestry Bureau of at least five per cent. of the area of the homestead before final title is acquired.

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In Bavaria, the statistic for the years 1899 to 1901, show a total forest area of 6,500,000 acres, of which 36% is State land, and 50% in private hands. The total income was \$1,000,000 and the expenditure \$4,760,000 leaving a net return of \$2.00 per acre. In 1901, the cut in the State forests was at the rate of 100 cubic feet per acre, and the net result per acre over \$4.00.

---

In Prussia the financial result for last year of the forest administration makes an excellent showing and together with the railroad administration has averted, not only the expected necessity of a loan of \$17,000,000, but left a surplus. Prussia in its government railroads, forests, mines, farms, &c., possesses an active investment, which is worth twice the Government debt.

The forest budget for 1903, closed with a surplus of over \$12,000,000, an increase of about \$2,500,000 above the preceding year.

For 1904 the income from the seven million acres of State forest is estimated at twelve million dollars, of which \$70,000 was expended for educational and scientific purposes, and \$1,300,000 for purchase of lands and special improvements.

Since 1883 the waste area in the hands of the State increased by 34,000 acres, the total acquired in the twenty years being about 215,000 acres, of which 85,000 acres or 1.43% of the Prussian forest domain remain in waste condition, the reforestation having proceeded at the rate of about 9,000 acres per year for the twenty years.

In Russia the income from the State forests in the middle of last century amounted to about \$500,000, in 1892 it was \$10,000,000, and in 1901 over \$28,000,000, in addition to \$10,000,000 worth of free wood. The net income was \$23,000,000, a remarkable increase due to a number of causes, but largely to better management. Of the 650,000,000 acres of forest controlled by the State, only about ten per cent. are worked under working plans. Only \$50,000 or one-half of one per cent. goes to planting, as against 7.5 per cent. in Prussia.—*American Forestry Quarterly.*

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The colored illustrations in this issue of the Forestry Journal are from a pamphlet descriptive of the Rocky Mountains Park of Canada, which has been issued by the Department of the Interior, and are used by kind permission of the Department. The Canadian National Park, which is unsurpassed in the beauty and boldness of its scenery, is becoming a favorite resort for pleasure seekers.

## REVIEWS.

*Report of the Forester for 1904—U. S. Bureau of Forestry, 38 pages.*

This is a general report of the work carried on by the Bureau in its various divisions during the year ending June 30, 1904, with an outline of what it is proposed to undertake during the present year. A considerable amount of work was done in surveying new Forest Reserves, making studies of forest conditions in various states, running valuation surveys over several thousands of acres, etc. In co-operation with private holders of timber lands working plans for 1,068,000 acres were made. Planting was begun on the Dismal River Reserve, in Nebraska, a sandy, treeless tract unfit for agriculture, by setting out 100,000 young pines. Next spring about 1,500,000 seedlings are to be set out.

A great deal of attention has been given to the study of timber preservation principally in connection with railway ties and piling, made of various kinds of pine, fir and spruce. Timber tests have also been completed, from which a large number of data concerning the strength of structural timbers have been obtained.

Up to the present the work of the Bureau has been confined largely to investigation work, and the collection of information relative to forest growth throughout the States. Now that the reserves have been handed over from the Interior Department, solving the questions involved in their management will probably be the chief occupation of the foresters of the Bureau in the future.

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*The Luquillo Forest Reserve, Porto Rico U. S. Forestry Bureau. Bul. No. 54. By John Gifford, D. Occ. Contains 33 pages, descriptive text, map showing situation of reserve, 7 plates and an appendix of 12 pages, giving text and short description of the trees of Port Rico.*

The bulletin is the report of a preliminary examination of the Luquillo Forest Reserve, situated at the east end of the island of Porto Rico, and set aside in January, 1903. The reserve is supposed to contain 65,950 acres, of which only about 20,000 acres is Federal forest land. The highest mountains on the island are within the boundaries of the reserve, which is evidently intended primarily to protect the water supply for the surrounding districts. From a general description of the forest 10,000 acres are estimated as timber lands, said to contain 25,000,000 board feet, the remaining 10,000 acres consisting of mountain peaks and palm lands. Very little lumbering so far has been done in the district, most of the wood used in the island being pine imported from the United States. The principal forest tree of economic importance seems to be the Tabanuco (*Dacryodes hexandra*, Griesb.), the wood of which is somewhat similar to that of yellow poplar or tulip tree of the Eastern States.

The report enumerates the general industries of the district, discusses transportation facilities and necessity for good roads, concluding with recommendations for the management of the reserve.

*Progress Report on the Strength of Structural Timber.* By W. Kendrick Hatt, Ph.D. Bureau of Forestry Circular No. 32; 28 pages.

This is a partial report of the results of some of the tests at present being carried on by the Bureau to determine the mechanical properties of various commercial timbers of the United States. Another publication will be brought out shortly giving detailed descriptions of methods used in making the tests, with a more complete report of all the results obtained. The tests have been limited to: (1) Species that promise to be on the market for an indefinite time; (2) Actual market products; and (3) Such purely scientific work as forms the basis for correct methods of test. The species undergoing investigation are: The Pacific Coast Red Fir (*Pseudotsuga taxifolia*); Western Hemlock (*Tsuga heterophylla*); Red Gum (*Liquidambar styraciflua*); and Loblolly Pine (*Pinus taeda*). The loblolly pine and Pacific Coast timbers are tested in the form of large sticks, such as bridge stringers. These are subjected to the various



strains which they would be called upon to resist if placed in actual construction works.

Short descriptions of the woods of the various species under test are given with the investigations made in each case. A number of tables show in figures the actual results obtained.

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*The Forests of the Hawaiian Islands; Wm. L. Hall, U. S. Bureau of Forestry.*

In Hawaii the best timber tree is the Koa, a highly prized cabinet wood, with a color varying through rich shades of red and brown and with a fine and distinct grain, but the forests are of as much importance on account of their influence on other industries as for their direct products. Those business interests which, like rice and sugar production, are largely dependent upon the mountains for a supply of irrigation water, naturally in most cases strongly favor preserving the mountain forests. So strong has been the interest of some of the sugar companies in the preservation of the forests that they of their own account have maintained large forest reserves above their plantations. Since 1882, the Government has undertaken work in the planting of denuded tracts.

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*Chestnut in Southern Maryland; Raphael Zon, United States Bureau of Forestry.*

Chestnut occurs in Canada only in Western Ontario, so that this bulletin is somewhat narrowed in interest for the Dominion. In Maryland the chestnut has been saved from extinction largely from its sprouting capacity. The conditions for the reproduction of chestnut from seed are unfavorable, owing to the demand for the nuts. The capacity to produce sprouts from the stump or from the roots is possessed almost exclusively by hardwoods, and sprouting from the stump or stool, generally known as the "coppice" method of management, is that by which the chestnut is generally reproduced. Stumps one foot high show the best results, and winter or early spring is probably the best time for cutting. Coppice chestnut furnishes better timber for working than chestnut from the seed; it is heavier, less spongy, and

straighter grained, is easier split and stands exposure to the air longer. Chestnut commences to bear seed when eight to ten years old, and continues to do so to a very old age, but regular and plentiful crops begin only after the twentieth year. The yield per tree averages between  $1\frac{1}{2}$  and 3 bushels or even more. The chestnut is a long-lived tree, attaining an age of 400 to 600 years.

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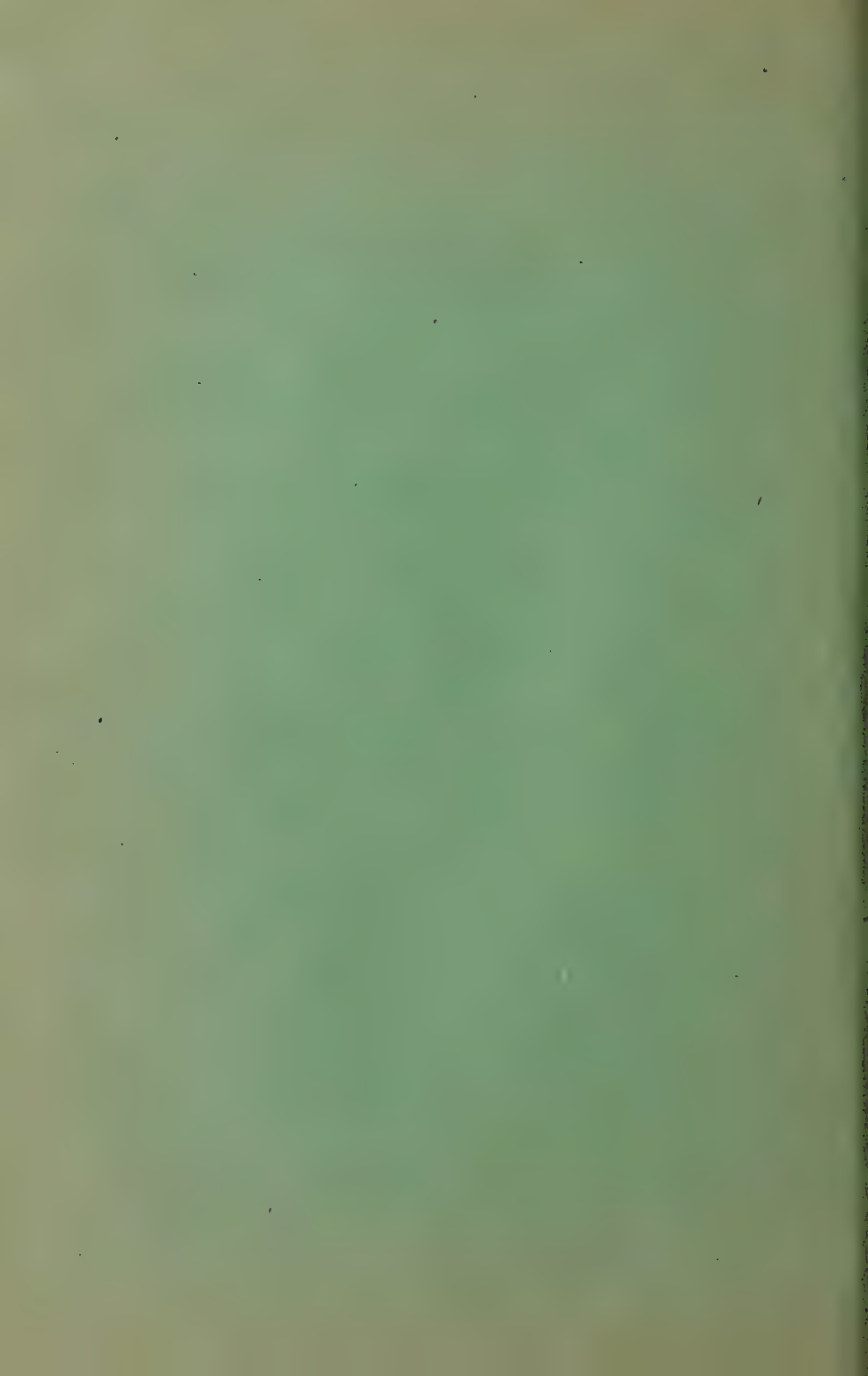
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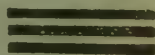




# CANADIAN FORESTRY JOURNAL.



JULY  
1905



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



# Canadian Forestry Association.

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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture, the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary,

**R. H. CAMPBELL,**

OTTAWA, ONT.

*Department of the Interior*

# CANADIAN FORESTRY CONVENTION.

## OTTAWA, ONT.

JANUARY 10th, 11th and 12th, 1906.

A Canadian Forestry Convention has been called by Sir Wilfrid Laurier, Premier of the Dominion, to meet in Ottawa on the 10th, 11th and 12th January, 1906, to consider the forests of Canada and means for their preservation and reproduction.

His Excellency Earl Grey, Governor-General of Canada, has been pleased to accept the position of Honorary President of the Convention and in doing so expressed his interest in its objects and his best wishes for its success. Sir Wilfrid Laurier has consented to act as President and the Vice-Presidents will be His Honour Sir Henri Joly de Lotbiniere, Lieutenant-Governor of British Columbia, and Mr. R. L. Borden, M.P. This official list shows that the Convention has the support of the leaders of the Dominion in national affairs and demonstrates clearly its national character.

Fuller details of the organization will be given at a later date. Its *personnel* will include all citizens interested in forestry and specially members of legislative bodies in the Dominion, members of the Canadian Forestry Association, Forestry Officials, representatives of Lumbermen's Associations, Farmers' Institutes, Educational Institutions, Mining and Engineering Societies, Fish and Game Associations. Forestry Bureaus and Associations in the United States will also be asked to send representatives.

The Convention will be under the auspices of the Canadian Forestry Association and the carrying out of the arrangements will be in the Association's charge. The Secretary of the Forestry Association will be Secretary for the Convention and further information may be obtained from him. In the next issue of the Forestry Journal announcement will be made in regard to railway arrangements, programme and other details.

It must be gratifying to the members of the Canadian Forestry Association and the friends of the forestry movement in general to see this public recognition of its importance. The opportunity for advancing the cause in which they are engaged and the interests of the country is invaluable. It is to be hoped that all will unite to make this Convention a success in numbers and in every other respect.





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A TYPICAL LUMBERING SCENE.  
Making Rollways of Pine Logs.



# Canadian Forestry Journal.

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VOL. I.

JULY, 1905.

No. 3

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## THE ART OF FORESTRY.

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*A. Harold Unwin, D. Oec., Forester.  
Benin City, West Africa.*

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### III. FOREST EXPLOITATION.

Giving the above its more appropriate name of forest utilization, one is led to the main object in Forestry i.e. of using *all* the woody growth in a forest.

In olden times in Europe just those trees which had any value were cut down and removed, leaving broken, decayed, diseased or at that time useless species of trees.

One of the best examples of this was the cutting, until recently (twenty years ago) of the largest spruce trees in the Bavarian Forest. Now this has consisted from time immemorial of silver fir (similar to balsam), spruce and beech; on the whole the beech and spruce predominating. Another well known fact is that fir wood is quite inferior to spruce for flooring or any purpose.

The result of this early method has been to reduce the number of spruce and, although the climatic conditions of growth are most favourable to its growth, it is suppressed by not being able to stand so much shade as either beech or fir.

With great labour and expense the old and rotten firs and beeches are gradually being got rid of and the spruce re-introduced.

If previously, as well as taking the spruce, some of the silver fir and beeches had been girdled and thus killed, the spruce could have held its place. The forest would have been much more valuable than it is at present and would also have saved the large yearly expense now entailed in clearing away the useless material in introducing the spruce on a large scale.

Of course it might be argued that it would not pay to do this girdling, but that is scarcely the case as the return proportionally is not very much greater now than it was then. Besides that it is much more expensive to do such extra work now than it was then.

In connection with the last named forest as soon as it was definitely worked (1870) it was found that locally very little timber was required, especially little or no fir timber. Sawmills were then started to make boards suitable for the Rhine Provinces, and this was done with such success that these supplies are now indispensable. The industries were thus permanently located in that forest, and their output is naturally limited by the permanent outturn of timber, which that forest is capable of yielding, and which is gradually increasing. The primeval forest by no means yields the maximum quantity of lumber per acre. In the above way lumberman and forester work together to mutual advantage.

A rather parallel process is at present going on in the mixed forests west of Ottawa. That is to say, where white pine is scattered in small groups or singly in large areas of hardwood, such as beech, maple, blue beech (hornbeam) and yellow birch. Of these at the present, the yellow birch is the only species of value or rather that it pays to bring out. The pine is taken, leaving little or none; its place is largely filled by poplar or hardwood. The pine by reason of its original small numbers has not the same chance of reseeding itself, hence such areas become practically valueless. It is of course rather presuming to say that beech, blue beech, etc., will have no value, but still the past seems to indicate that there is little hope of their value being so great as to justify their permanent production; at any rate on such areas as they at present occupy.

Even under a careful plan of artificially helping the pine to

keep its place always sufficient hardwood will remain to supply the very limited market. 85% of all timber used all over the civilized countries of the world is coniferous, and only 15% hardwood, consisting of over fully 200 species. Even in the tropics pitch pine of the Southern United States is largely used, local timber either being too hard or liable to attack by ants.

From the above it will be seen that where the pine is found singly or in small groups, removing it as soon as the old stand is cut, and then cutting the surrounding trees to give a start or clearing any existent growth of hardwood threatening to overgrow the seedlings, will be the only way to procure a future crop as good, and indeed in many respects, better, than the one before.

If a means were found to profitably carbonize or otherwise use the hardwoods the problem would at once become different, as the pine would then have an equal chance with the poplars, etc., of reseeded the areas thus cut over.

With the modern pulp mill as well as saw plant, a forest becomes much more valuable and capable of management with an eye to the future, as well as to the exploiting for present needs. Again this time element, such a potent and yet most essential factor in forestry, crops up and indeed in such a way that it cannot be denied.

The question arises whose business is it to look after a future lot of lumber, which the present man does not need, but which everyone sooner or later very much wants. Scarcely the present owner or user of the forest, he does not live long enough to reap all the benefits of his provident policy.

A corporation may, if it is organized with an idea of being carried on permanently or nearly so; nevertheless it has its shareholders to consider, and they want their dividend to be a large one, and they only hold the shares speculatively, or at most, until they see something still better to put their money into. It therefore devolves upon the representatives of the whole country *i.e.* the government, to safeguard these very vital interests.

In some countries, notably Russia, the government has car-

ried this a little too far, and become sawmiller and lumber manufacturer in general to the community. This is scarcely compatible with modern ideas of trade and is bad economically.

Under other countries, notably Germany, the forest department has become wood cutter and general producer of all forest products in the *rough*. This is admissible, but demands a very large organized staff going into details, with regard to felling, cutting into lengths and bringing to roads or other place of transport. The timber is what is known as "sold in the wood." This on the whole gives the best results. Another method is to sell on the stump, leaving felling, etc., to the buyer, an easy and yet poor method from the point of view of forest reproduction. On the whole the best method for all parties concerned is the second mentioned, though in some countries, namely India, the last named has worked admirably.

Each country thus adopts what most suits its needs, but the idea underlying that chosen method is the same, that of wisely constantly using the forest products as they financially gradually mature, only to be renewed again and again.

The growing trees of a forest are therefore not a fixed but a very slow movable capital.

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A change has been made in the law of the Province of Quebec by which a free grant of 160 acres of land was made to the father of twelve children. It was found that these grants were being made use of by speculators who wished to obtain control of timber lands, and that the objects of the Act were not being served while the Province was losing the timber lands. In order to put an end to this speculation, the Act was changed last year, so as to offer a bonus of \$50 in lieu of land. Nearly four thousand claims were made for this bonus, not only from farmers, but from residents of cities, towns and villages, who would never have thought of applying for the land if the Act had not been amended. A further amendment has therefore been made, providing that the bonus shall be paid to those whose claims have been recognized up to the date of the passing of the Act.



## FOREST FIRES IN BRITISH COLUMBIA IN 1904.

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Mr. J. R. Andersen, Deputy Minister of Agriculture for British Columbia, has kindly placed at the disposal of the Forestry Association, the reports received from the agents of that department, in regard to the forest fires throughout the Province generally during the year 1904. As has been made known through the medium of the press, the forest fires in British Columbia, during the past year, were of special severity owing to the dry season. Throughout most of the summer in some districts a pall of smoke hung over the country sufficient to obscure the view and prevent surveying operations. The direct loss to the Province was large, and the effect on the mining and other industries requiring wood supplies will soon make itself felt. The question of dealing with these fires is one of the most important ones which can be given consideration by the Province of British Columbia at the present time. The revenue derived by the Province from these forests during 1904 was \$446,276, a substantial increase over the previous year's revenue, which amounted to \$347,004. In regard to lumber supplies the future is in the hands of British Columbia, her forests of virgin timber are still great and valuable, the development of the western territories, and the industrial growth of the Dominion generally will make large and increasing demands upon them, and properly administered, they should make British Columbia the richest member of the confederation. At no distant day the public revenue from the forests may be expected to reach a million instead of half a million dollars, and will not then have reached the limit of the possibilities. Capitalize such a revenue and the Province might well spend a large sum in providing protection from fire without going beyond what would be a low rate of insurance. Experience has demonstrated that the forests can be protected and failure to take effective measures to do so can, in the light of present knowledge of the subject, be hardly less than criminal.

For the New Westminster District the report of the agent

states that the bush fires were the most destructive since the year 1893. The area burned has been very extensive and the value of timber destroyed is probably not less than half a million dollars. The worst fires were in the northern part and are believed to have been due to the carelessness of prospectors, particularly persons prospecting for coal. Some fires arose from want of care on the part of persons clearing land, but the damage done in these cases was comparatively small. Five persons were prosecuted under the Bush Fires Act, and three persons were obtained. This report urges the appointment of fire wardens and that no person should be allowed to set out a fire without permission of the warden.

In Southern Vancouver Island the fires were numerous during the month of August when high winds prevailed. In some cases a great deal of valuable timber was burnt and bridges and buildings were also destroyed. There seems to be considerable carelessness in the handling of fire and the railways are responsible for their share. One report states that the fires are mainly due to sparks from locomotives used for hauling out the timber from the logging camps, and along the line of the Esquimalt and Nanaimo Railway.

On the northern coast there were no fires at Port Simpson as the rainfall was heavy, but in the Atlin district there were several small fires due to prospectors. In regard to these the agent states that while these fires, as such, did not attain any great force or volume, a fire of any volume whatever is regrettable in such a sparsely timbered section and any damage whatever is serious.

In the Cariboo District, the central northern part of the Province, there were a number of small fires through the settled districts, and in nearly every case the fires originated from careless campers travelling; whites, Siwashs and Chinese are all alike and equally careless in regard to camp fires, and it is about impossible to get and convict the right party. Forest fires were observed to the north and east burning for days but their cause and extent could only be conjectured. "Bush Fires Act" notices are posted through all the settled district.

Coming south to the Lillooet District, the central district north of the railway, the reports show that this part of the country suffered severely. One agent states that this was the most deadly year since 1869, caused by an almost total absence of rain. A quotation may be made from his report. He says:—

“ Bush fires commenced early on account of the extreme dryness of everything, and as a matter of fact I saw smouldering remains on Nov. 3rd, on my way to and from Lillooet the other day. Men—white, black, brown and yellow—are responsible for these fires, by the utter carelessness and want of thought that is inherent in nearly every human being. I tried for a conviction against three whites last August before two justices of the peace, but was met with the Scotch verdict “not proven” although they were the originators of a most dangerous fire without a doubt. High up in the mountains the Indian is responsible. He fires there for a crop of tender young grass in the fall for the deer. In the valley of the Fraser he fires, in accordance with the custom, to light the salmon on their way up the river. It does not appear that it has dawned on him to any extent that the paleface at the mouth of the river is responsible for their absence. With regard to the estimated destruction this year; that is simply beyond my power, to say nothing of the consequent destruction and loss, which may be approximately arrived at, in the event of a hard winter, next April by counting heads of dead and dying domestic animals on the various ranges which are already appallingly bare throughout the entire district.”

The mountains round the town of Lillooet were burned, in several places from base to summit, extending over large areas. At other places forest fires raged for a long time travelling long distances.

In the northern part of Yale District, being the central tract immediately south of the railway, the fires were not of serious proportions, the persons located in that district having evidently been trained to carefulness.

In the southern part of Yale the report from Grand Forks, near the international boundary, states that a vast extent of the country was run over by fires during the past season, in fact at

one time the whole surrounding country appeared to be suffering, but how far the fires reached back it was impossible to say as no one seemed to know where they ended. In response to the request for an estimate of the destruction the agent states that this is fairly a poser, but there is no doubt that a great amount of destruction was done by the past summer's fires. To say nothing of the loss to miners and prospectors of their buildings, tools, &c., the destruction of timber and young forest was most deplorable.

A significant fact in view of the rapid railway development in Canada at the present time, is that given in the following paragraph:—

“The most serious of the three (fires) occurred near Ehatt, and was supposed to be caused by *the fires getting away from the men clearing the right of way on the new railway line of the Great Northern Railway Co. from Grand Forks to Phoenix.* This fire burned for a considerable time among fallen timber, and though efforts were immediately made to check it, it was only after a rainfall that any successful stop was put to it.”

The agent reporting from West Kootenay does not attempt to give any description of the fires or the loss, merely stating that it must have been considerable. He does not think that a fire warden service could be made large enough to be effective and winds up with the suggestion that “perhaps the most effective prevention would be a heavy and opportune rain.” Whether this is a suggestion to the Government of British Columbia to go into the rain-making business is not clear, but it certainly sounds like the counsel of despair.

This is a general statement of the reports received and while the details are necessarily not definite, they show clearly that the loss to the Province has been large and point to the necessity of some more decisive action than has yet been taken.





WHITE PINE IN GERMANY

Natural reproductions, from trees 120 years old, showing gradual removal of the old crop.



A diseased Red Oak —Fig. 1

## DISEASES OF TIMBER.

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*J. Horace Faull, Ph. D., University of Toronto, Toronto.*

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Trees while living are subject to the attacks of various plant enemies, mainly fungi and bacteria, and when dead are immediately set upon by a legion of other members of the same groups. Biologically, the first set are parasites, for they derive their nourishment from the life streams or stores of their hosts, and the latter are saprophytes, for they obtain their livelihood from dead tissues and plant remains. The parasite is of interest to the biologist in that it presents a three-sided struggle in the fight for existence, the struggle between the parasite and the host on the one hand, and between the host and its uninfected fellows on the other. More than one termination is possible in such a struggle, but in most cases the greatest desideratum of the economist is the evolution of a form that is proof against attack. The saprophyte is of interest because it is a factor in the breaking up of complex organic compounds (incidentally ridding the earth of vegetable debris), and restoring again to soil and air the simple food materials essential to the existence of present and future generations. Without the restoration of these all life would soon cease to be, for the reserves of unused food substances in nature are too small to allow for a break in their circulation.

The forester, the lumberman, and the wood-consumer, look at these wood-attacking bacteria and fungi from a somewhat different standpoint. To them the parasites are the causes of the deformation, stunting, and death of greater or smaller quantities of timber, decreasing and depreciating the supply, and providing material for destructive fires; and the saprophytes are the cause of certain rots and discolorations, resulting frequently in the ruin of sawn but unused timber, and the necessity for the untimely renewal of such as has been put into use. There is hence a demand made by them of the economic botanist for two things, first, the prevention of further infection in the forests, and

second, the treatment of wood products to ensure reasonable service.

The parts of the trees attacked and the immediate effects produced are various. In some cases the disease works in the roots, rendering treatment extremely difficult. In other cases the fungus may grow in the soil at first, and then entering by the roots work its way up through the stem, its presence becoming apparent only when the tree begins to die or the fruiting bodies of the fungus are found at its surface. More frequently the spores of the parasite infect the host at some wounded spot or region of careless pruning, and as in the last instance may live in the host unsuspected for years. Such a case is represented in figures 1 and 2, in which the fruiting bodies of a polyporus are shown upon the surface of the trunk of a red oak. The removal of these plague spots should be attended to promptly when they make their appearance on trees in streets and parks. The carelessness displayed in the treatment of shade trees is lamentable, people and animals being allowed to wound and maltreat them, thereby exposing them to the almost certain entrance of destructive fungi. The smallness of the number of undiseased and undeformed trees along the streets of most cities is deplorable, and altogether inexcusable. Illustration 3 tells its own story.

Sometimes the disease reveals its presence by swellings, or other malformations. Even in the case of the red oak in Figure 1, it is observable that the base of the trunk is abnormally enlarged. This local stimulation to growth is not at all uncommon. A rather interesting example of deformity is to be seen in the so-called witches' brooms of the balsam fir (photograph 4), the cherry, alder, some of the birches, and a few others. Generally the infected area becomes swollen, and all of the buds, including the dormant ones, develop, forming a dense mass of distorted and stunted branchlets. Another manifestation of disease and its effects is represented in Figures 5, 6 and 7. The host in this particular example was black spruce, and the parasite a rust that attacked the leaves. In Figure 5 there is one uninfected leaf, and the spore cups of the rust are shown growing upon all of the rest. Nearly all of the leaves on the diseased trees, which



included most of the trees in the swamp, were attacked, the disease being evident at some distance away, because of the yellow color of the foliage. Early in September the leaves dropped, and the trees robbed of their foliar organs soon died. No sooner were they dead than various saprophytes began their work, a shelf-fungus, as in Figure 7, being one of the most frequent invaders.

The wide-spread occurrence of these diseases is probably greater than most people imagine. In the instance that I have cited as coming under my own observation a considerable portion of the swamp suffered. In Queen's Park, Toronto, few sound oaks are to be found, nearly all being sapped by a *Polyporus*. Recently a research, instituted by the United States Government in South Dakota, showed that half of the standing timber in the forests of that State, including the Black Hills Forest Reserve, had been killed by a certain disease, and that unless means were speedily taken to check the trouble, the remaining trees would go in the same way.

Happily the effects are not usually as dire as in the last instance mentioned, but even a casual observation of a forest shows that many branches die from one cause or another, and that here and there a tree has succumbed. The direct loss may not be great, but dry fuel is furnished for fires, the results of which may be disastrous. A safe remedy where it can be applied, is to remove mature timber, for it is most liable to disease, and all infected timber, no matter of what age. Unfortunately such a procedure has not yet been found practicable on the reserves in Ontario.

The successful treatment of cut and sawn timber for the prevention of disease, is one of the problems that bids fair to solution. Such timber is very liable to rot, especially if used in a moist place. This is true of wood covered wholly or in part by soil, as in the case of telegraph or telephone poles, fence posts, railroad ties, bridge and foundation timbers, planks for pavements and so on. Frequently, too, timber often discolors, thereby depreciating in market value. Thus "green" and "blue" wood not uncommonly occur, the color in each case being due to the presence of certain fungi, that either contain a pigment within

themselves or secrete a dye that stains the wood. Some woods are much more resistant to attack than others. One of the chief causes of this is the presence of an antiseptic substance in the tissues that was produced when the plant was in life.

The only thing needed to render all cut woods immune from attack is to treat them with some preservative that will mechanically prevent the entrance of fungi and bacteria, or that will act as an antiseptic. From the practical side, such treatment must not only effect that end, but to say the least, should not injure the physical properties of the wood essential to wear, and must be within a certain cost. A few experiments have been made, and with some success. Thus it has been found that the life of white oak may be lengthened out to about 15 years after treatment with creosote and other preservatives. Untreated, they last about 10 years. Similarly some of the softer woods have been treated with advantage, indeed, some otherwise quite unfit for railroad ties, have been made to take the place of the rapidly disappearing oak. These experiments are hopeful, and give promise of an economical production of serviceable woods in an age in which economy is absolutely necessary if the supply is to be maintained.

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The subject (of forestry) is of importance far beyond the general understanding of the public. The growth of population in the United States has practically covered all the land which can be cultivated with a profit without artificial moisture. Irrigation and forestry are the two subjects which are to have a greater effect on the future prosperity of the United States than any other public questions either within or without Congress.—*Jas. J. Hill, President of the Great Northern Railway, in Report of American Forest Congress.*



Two Plague Spots.—Fig. 2



A tree which has received serious injury to the bark.  
A type of many street trees —Fig. 3



## THE GASPESIAN FOREST RESERVE.

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The following report recommending the setting apart of a Timber Reserve, has been submitted by Mr. W. C. J. Hall, of the Crown Lands Department, Quebec, to the Commissioner of Lands:—

I would beg respectfully to represent to the Hon. Minister that in the Gaspé Peninsula there exists an opportunity of creating a forest reservation which would possess unrivalled advantageous features for the perpetuating of the forests therein comprised, and the maintenance for all time of the water supply of that region.

I question very much if on the continent of America a better site could be found for exploiting the system of Forest Reserves than in this locality, a system which the United States has adopted unreservedly, and which the Dominion of Canada is fast awakening to, *e.g.*, to-day in the Province of Ontario the Government has set aside territory unsuitable for profitable agriculture to the extent of no less than  $5\frac{3}{4}$  millions of acres, and I have no doubt the intention is to keep on increasing the reserves.

In Germany the State forests comprise an area of thirty-five millions of acres, but they have been practising forestry for one hundred and fifty years.

By the term "Forest Reserve" I would point out that it is not the intention to prohibit the cutting of mature and ripe growth. This can be allowed in the ordinary way under "Timber License," as exists to-day. But by creating such reserves in suitable localities the Government is in a position to enact remedial legislation if it be found that removal of the mature growth is not succeeded by a crop of like species.

It is claimed by some that after cutting the mature coniferous growth the deciduous trees preponderate and snuff out the existence of the smaller coniferous growth existing under the canopy of the broad-leaved varieties.

Should this prove to be the case, then the Government could study the subject and adopt the best means for inducing a succession of the conifers, which varieties of timber are best adapted for the requirements of this country, being so easily floated to the manufacturing points.

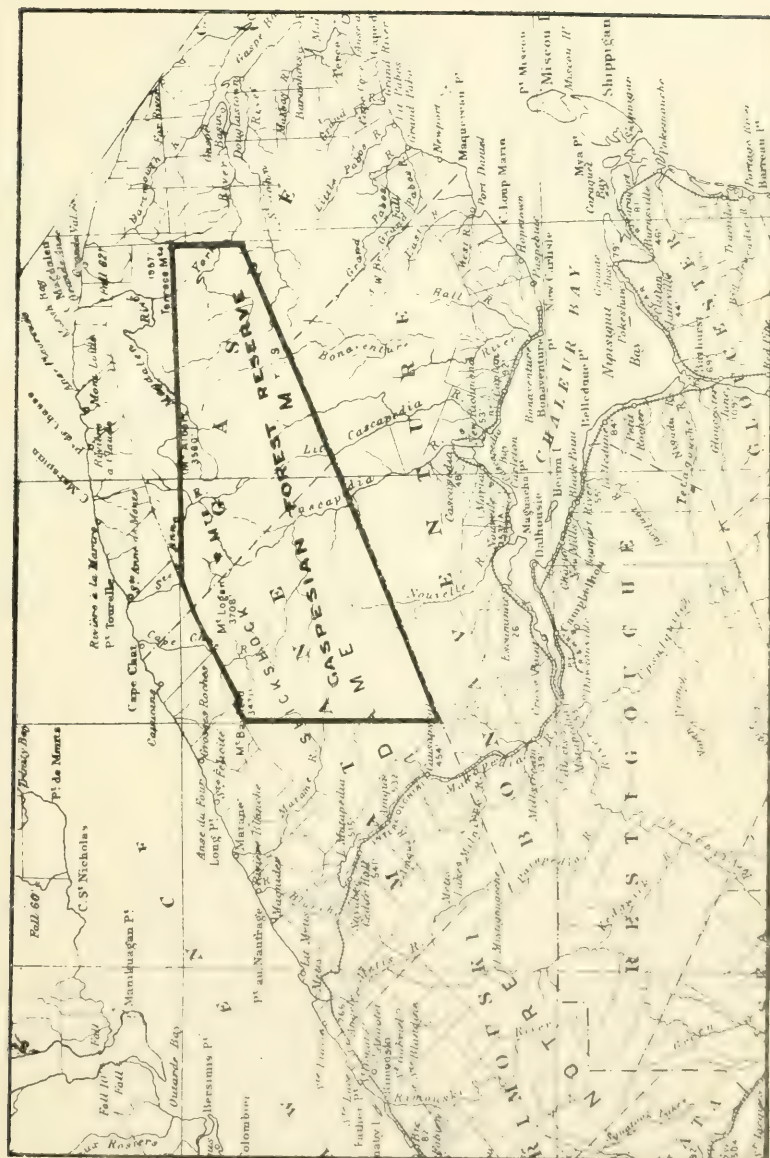
The White Spruce, the predominating variety of timber in this Province, is so prolific a seeder naturally, that many are of the opinion that, provided mature growth only be cut, crop after crop can be taken at intervals of the same variety off the same territory. If this be the true state of the case, then the perpetuating of our Spruce Forests is a forestry problem easily solved. We have only to exercise ordinary care and we will continue to maintain the position now held, viz., the most extensive spruce growing country.

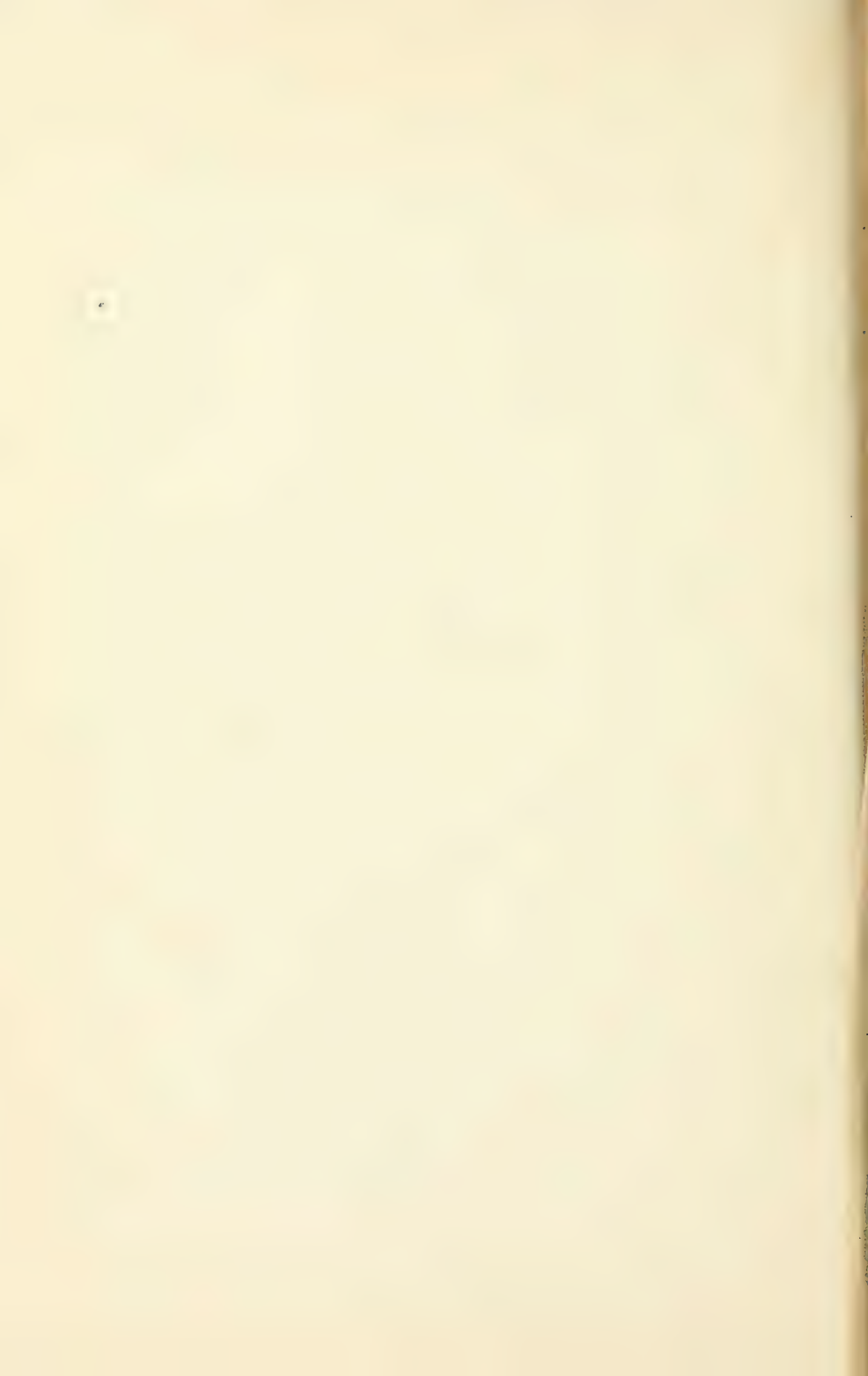
I submit a district map of the Gaspé Peninsula with the territory outlined in green which I would suggest being created a reserve. A glance thereat will show how vitally important it is to this locality to have the sources of rivers left in forest. About a dozen large streams take their rise in the Shick-Shock Mountains which form, as it were, a backbone to the peninsula; these streams run in all directions from the main apex, *i.e.*, the said mountains.

We all know the character of the soil in this district, viz., sandy loam and friable, until one reaches the foothills of the mountains. Imagine the consequences if the sources of these rivers were denuded of forest growth—disastrous floods in the spring, the streams nearly dry in the summer time, the soil carried away from the declivities in immense quantities by the freshets, and finally the whole territory rendered, comparatively speaking, a desert and uninhabitable.

Should the projected railway from Casupscull to Gaspé Bay be completed there would be an additional reason for protecting lands to the north of same, as we have had experience of a bitter nature as to the forest fires by operation of railways.

At the present time it is quite true that there is no danger to be apprehended of lack of timber or water in the Gaspé Penin-







sula, but it is more prudent to take precautionary measures now before any particular locality suffers than to wait until matters are in the same condition as in the western part of the Eastern Townships, the Chaudiere River, the St. Francis and the small rivers flowing north into the St. Lawrence.

I myself have seen the old stumps of fifty or seventy-five years ago being exploited for firewood southwest of Montreal. I have met men who, visiting these places, which they were familiar with many years ago, were unable to find the brooks and streams they used to fish in, nothing being observable but dry beds partly grown with weeds.

The territory I should suggest being created a forest reserve can be described as follows:—

“Commencing at the intersection of the 67th meridian, thence along the rear line of Bonaventure County, thence on the same bearing to the 65th meridian at Lac Edouard; thence north along the 65th meridian to the 49th parallel; thence east along the 49th parallel to the intersection with rear line of Township Cap Chat, hence following rear line of Townships Romieu and Dalibaire and Cherbourg to the 67th meridian; thence south along the 67th meridian to the place of beginning, comprising an area of about 2,500 square miles, or say 1,500,000 acres, more or less.”

Quite a large percentage of this territory is under license to cut timber, and if created a reserve these limits would immediately be enhanced in value by reason of such action; better bids would be obtainable for the lands not already licensed when put up for sale,—any lumberman being willing to pay more for a limit in a reserve than an equally well timbered berth outside of it where there is danger of encroachment by settlers. And as regards settlers and colonization, such reservations of river sources and watersheds are directly in the true interests of such movements—at least the very best and most learned authorities are unanimous on this point.

The natural irrigation of the Gaspé Peninsula, as it exists to-day, is perfect. By all means let us maintain it.

To demonstrate the remarkable concentration of river sources

in the Gaspé Peninsula, I give herewith a list of the prominent streams which take their rise in the interior, viz., the Rivers Matane, Cap Chat, Ste. Anne, Magdalen, Dartmouth, York, St. John, Bonaventure, Little Cascapedia, Nouvelle Escuminac, Casupscull.

At the risk of repetition I would reiterate that it is highly important to preserve such a system as the above represents until at least the demands of colonization have entirely acquired and put to profitable use the lands lying outside of the boundaries of the suggested reserve.

As a matter of secondary importance only to the preservation of the forests and water supply, I would remark that the said territory furnishes a magnificent opportunity to create a hunting and fishing reserve, which would be of the greatest possible annual value to the residents. Were this tract properly protected I venture to say that in a comparatively short time it would become as well patronized by sportsmen as the northern part of the State of Maine is to-day—and we are all familiar with the statistics here alluded to, since they figure on more than six figures as direct and indirect revenue annually from this source.

An appropriate appellation for the Reserve would be, say, "The Gaspéian Forest Reserve."

I would remark that in other parts of the Province it would be well to create such reserves, but this can be gone into later.

In accordance with the recommendations made in the above quoted report an Order in Council was passed by the Government of the Province of Quebec on the 28th April, 1905, setting apart a Forest Reserve as described under the name of "The Gaspesian Forest Reserve." The Order states the objects of the reserve to be the preservation of the forests whilst permitting the cutting of timber as provided by the regulations now or hereafter in force, thus ensuring the maintenance of natural irrigation as exists at present and which is necessary for the most successful prosecution of the agricultural industry and for the protection and perpetuation of the fish and game in said region.



Witches' Broom of Balsam Fir—Fig. 4.



A Group of P. E. Island Birches.



## THE GENERAL AWAKENING AS TO FORESTRY.

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The *Farmer's Advocate* pertinently animadverts on the sad system of deforestation in full swing all over Canada, and, recalling some of the trite yet unanswerable arguments against such short-sightedness and neglect, suggests as an encouragement to tree culture and wood preservation, the passing of an act, in Ontario, to exempt woodland from taxation. We presume that the preserves of lumber kings or wood producers on a large scale, operating their limits on sane principles, and making abundant returns, would not be comprehended in this paternal legislation. There might be a difficulty in applying the fostering law with exactitude, but anything which may teach the unthinking the value of the wood area of the farm, to the farm itself, must prove of incalculable benefit to the country. The state, too, should regulate as it does in older lands, this mania for clearance where clearance is not desirable; and where, by it, the water sources, health and protection of the community are seriously threatened. Wherever the lands are still vested in the Crown, it is criminal at this stage, and with the evil results of it plainly before us, to permit of greater denudation than has already taken place. There are certainly strong reasons, from the position of the General Government, for retaining the administration of the lands in the new provinces of Alberta and Saskatchewan, but none appeals to us more strongly than that advanced in favor of a retention and extension of the woodlands of the north. Federally, it would have been impossible to have left Prince Edward Island in the sad position she is in to-day for want of forest. The Local Administrations of the past without a formal bureau of agriculture, apparently without any knowledge of important conditions of, and requisites to sane living, with only a desire to bridge over the present difficulty by the sacrifice of everything within reach did not hesitate to lend itself here to a system of colonization which, as everyone knows, has jeopardized very largely provincial life and prosperity. The Government of the day if ever so well disposed, is practically impotent in the premises.

Only in the manner suggested by our Ontario confrere, can it now help us; and so far as we are concerned, we shall urge upon them and the public generally, the good sense and patriotism of such a move.

#### BUT THE FEDERAL GOVERNMENT

must find some means, even outside the regular way, of stimulating a return to proper methods here. The proportion of forest and field is impaired seriously, but under educative and paternal influences, can be practically restored in a short term of years. A land of rich and varied forest when the white man's foot first touched the soil of Isle St. John, there is a natural tendency to recover its place to an extent equal to all hygienic, agronomic and economic needs quickly; and areas protected from the pasturing cattle, seeded from neighboring bearers, grow up thick with a mixed stand of beautiful trees. Let Ottawa only quietly insinuate its influence for good in this matter then, if the door is not open to authoritative action, and much good will be the result. This province could not resist a desire so beneficent; and the good once done, the asset is surely a national one.

#### SIR WILFRID, FORESTER.

We were delighted, in a conversation with the head of the Canadian Government the other day, to discover that Sir Wilfrid Laurier is a warm friend of systematic forestry and an enthusiastic lover of trees. In all his varied accomplishments, and admittedly he has many, there is none that does him more honor, nothing more becoming, nothing which bespeaks the warm heart and those gentle feelings which imperceptibly bind men together. He well remembers the calmer and more peaceful days of early manhood, when, in the quiet village which claimed his Quebec home, he planted, tended, and thoroughly enjoyed not only the fructifers of the orchard; but, also, the stately shade trees from the adjacent hillside. Everything grew he touched, and thus, his early enthusiasm absorbed by greater things for the moment, has never diminished in the slightest degree. In him the friends of forestry, and they are Canada's best friends, will ever find a sincere and generous patron. There is great need of a broad and

provident forest policy for this Dominion. We are going into the great northland forests now, and the mistakes of older Canada must not be repeated. To provide against this and to plan wisely for the future of this grand country a formal head in the departmental economy of the government is an urgent necessity. This will better advance the common weal. We know that Sir Wilfrid can be relied on to listen to any reasonable proposition for the betterment of our forestry relations,—aye, he will not only listen, but he will formulate himself, we trow, a new policy which will repress on the lips of future generations with regard to the beautiful forest, the sad avowal of so many in the older provinces, face to face with desolate waste—"too late! too late!"

#### FORESTRY CONGRESS.

There is to be a National Congress at Ottawa next November. Sir Wilfrid has already signified his sympathy with the movement. Not only that, he intends being in it and of it; and for this has the high precedent of President Roosevelt. We know that his influence, his example, his warm word, and above all, the cheerfulness with which he will give of the Nation's revenues to greatly increase them by wise forestry regulation, will quickly, if not completely retrieve the lost ground in this important interest, and thus permit him to earn a new title to every just man's gratitude.

#### EXEMPTION A DESIDERATUM.

The idea of exemption in the *Advocate's* mind should not in the meantime be lost sight of, in the provinces. Nowhere so urgently as here should our rulers act. The taxes are not exorbitant, but taxes are always unwelcome. The release of woodland under certain conditions, should be a good thing. The wood-lot might speedily come to be recognized as a public benefaction and the youth of the land, from advertising through the exemption, disposed to study the underlying principle. Then, unpastured woodlands, which alone deserve the special care of the Government, would be speedily increased in area, and agriculture, hygiene, esthetics, and general economics favored beyond dispute. Let us hear from our legislators then in some practical way along these lines.—*Father Burke, of P. E. I., in the Maritime Farmer.*

## THE NIPIGON TIMBER RESERVE.

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By Order in Council, dated the 7th June, 1905, the Government of the Province of Ontario, has set apart the Nipigon Timber Reserve, surrounding Lake Nipigon, north of Lake Superior, as shown on the sketch on another page and described as follows:—

“Commencing at the southeast angle of the Township of Ledger, east of the Nipigon River in the District of Thunder Bay, thence due east astronomically twenty-two miles, thence due north astronomically ninety-eight miles, thence due west astronomically seventy-three miles, thence due south astronomically ninety-eight miles, thence due east astronomically to the southwest angle of the Township of Purdom, thence due east astronomically along the south boundary of the Township of Purdom, and along the south boundary of the Township of Ledger, a distance of fifty-one miles in all, to the place of beginning, containing by admeasurement seven thousand one hundred and fifty-four square miles.”

There are of course the usual exceptions of lands already patented, Indian reserves, &c. The total area of the reserve, including water, is about four and a half million acres.

The country surrounding Lake Nipigon and now included in the reserve is mostly of Laurentian or Huronian rock formation and except in the western portion of the reserve, has but few tracts of good agricultural land, these, where they occur, being situated along the river valleys. It is not a district that can ever support an agricultural community in large numbers, although where the land is suitable it is possible to raise crops of some value. At the Hudson Bay posts and the missions, efforts in this direction have been made with success, and as the climate is stated to be similiar to that at Lake Temiscaming, there seems no reason for doubt on the question. Barley, potatoes and other vegetables and small fruits ripen readily at Nipigon House. The Nipigon district obtrudes on the line of the great northern clay







belt, through which the new transcontinental railway line is to run and causes a deviation to the north. It is now accessible from the Canadian Pacific Railway by way of the Nipigon River, and is already a favourite resort of sportsmen. The Nipigon trout is famous and is a great attraction to all lovers of the rod.

While the agricultural value of most of the district is of little moment and its mineral resources are yet uncertain, the value as a timber preserve is unquestionable, although the pine is not now the characteristic tree in that region. The forest consists mainly of spruce, tamarac, jackpine and birch. Considerable areas have been burned over but are renewing the forest where second fires have not completed the work of destruction by sweeping away the new growth. There are still good timber areas, as that along the Ombabika River which enters the north-east corner of the lake, in which it is estimated that there are 1,484,000 acres of pulpwood aggregating 56,346,400 cords. With protection from fire it may be expected that this reserve will in time become again well timbered throughout its area, and will be of great value not only on account of the pulpwood but also for the supply of ties for the railway development which that district may expect in the not distant future.

A description of the district along the Ombabika River is given as follows:—

" In commencing our work we went up the Ombabika River and, as we ascended this river, as far as we could see from our canoe, both banks are well timbered. The land along the banks is mostly sandy; and about ten miles up this river from Lake Nipigon I was instructed to make my first exploration at right angles from the river, and in this trip for the first mile was rolling sandy soil timbered with white birch, spruce and poplar, and then a rocky country evidently an old *brûlé*, as it is now grown up with small jack pine and scrub spruce, and the timber in this exploration would only cut out about ten cords of wood per acre. On the north-west side of the river, and some three or four miles farther up stream in this exploration the timber is much better and the land rolling, with some nice sandy loam flats broken by rocky ridges, and I put the pulpwood, jack pine and spruce only.

at about twenty cords per acre. The balance of timber is white birch, some poplar and balsam. Farther up the Ombabika River and south we found a splendid spruce and jack pine growth around Robinson Lake. This lake is about eight or nine miles south-east of the river and flows into the Ombabika River by a stream called Robinson River. This stream flows through a valley of low marshy land, with a rolling rocky country back from the river and well timbered. Two streams flowing from north-east are tributary to Robinson Lake, with splendid spruce along both streams as far as I saw them. The land in this exploration is not farming land. I put the cut of pulpwood at about thirty-five cords per acre. The balance of the timber is small tamarac and poplar. Ascending the river to Summit Lake and exploring both sides of the river, no farming land is found. There are some flats along the banks, but they are low and swampy and produce some fine large thrifty tamarac. Back from the river the land is rolling and rocky in the low places. We found splendid spruce, and some poplar, and on the slopes and tops of hills white birch and jack pine. From the forks, that is from the mouth of Robinson River, to Summit Lake, a cut of thirty-five to forty cords per acre is about what we would get there. Then we have a fine lot of good tamarac, the remainder of timber being balsam, poplar and white birch."

On the numerous rivers flowing into the lake and on the Nipigon River flowing from it are many water powers of good fall and volume, and which will be useful for manufacturing purposes, or in the time, which it is to be hoped for the sake of the forests is not too far distant, when steam power on railways will be succeeded by electricity. The preservation of the forest will mean the life of these waters.

In the district surrounding Lake Nipigon large game are not plentiful. Few moose or caribou are found, owing probably to the Indians hunting them recklessly and also to the burnt-over condition of much of the country. It is stated that a few years ago the caribou used to be plentiful, while moose were not to be found at all. Recently the moose have been growing more plentiful while the caribou have been disappearing. The country af-



fords splendid grazing ground for these large animals. Small shrubs are plentiful, while the moss for the caribou is found covering large areas.

The smaller fur-bearing animals, such as mink, otter, beaver, martin, muskrat and fox are plentiful, and are trapped in large numbers by the Indians for the Hudson Bay Company.

One curious fact in regard to the fauna of this region is given in the following extract from a report made in 1900:—

“Red deer and wolves first made their appearance near Port Arthur about three or four years ago. They are still very scarce but a number of them have been killed. Mr Hodder, Indian agent at Port Arthur, showed me the skin of the first wolf seen near that place. An Indian had killed the beast and had asked Mr. Hodder what kind of an animal it was. A number of men I met expressed the belief that the red deer had been driven into the district by the forest fires that had raged in the northern states, and the theory appears quite feasible as they were not found in the vicinity until after one of these great fires.”

Considerable controversy has arisen in British Columbia over a lease of lands on the Coast and the North of Vancouver Island, which the Provincial Government proposes to grant to the Western Canada Pulp & Paper Co. The area concerned is some 163,000 acres, and a protest against the lease has been made by the B. C. Loggers' Association, on the ground that the timber in that district consists mainly of cedar, and that there is very little wood suitable for pulp making. The Pulp Company, on the other hand, contend that any of the trees, even cedar, can be used in the manufacture of pulp and paper, no matter what their size. Any wood can, of course, be used for pulp, but the question is as to the best and most economical use, and in as far as cedar is concerned, the large trees of British Columbia might profitably be put to other purposes.

## THE POPLARS.

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The poplars, generically known as *Populus*, are large fast-growing trees which are represented in Canada by several species, commonly occurring. The balsam and the aspen poplar are usually the most common, and are found in nearly all parts of the Dominion, the aspen especially springing up after fires. Besides their quick growth, a reason for their rapid spread is the nature of the seed envelope, which is of light cottony texture, and by which the seeds are carried for long distances on the wind. This habit has made these trees objectionable for street purposes, as when the seeds are falling the roads are covered with the white cotton. The habit of spreading by suckers, which is specially noticeable in the balsam poplar, also causes them to be looked on with disfavour. The poplars are subject to insect attack, and the wood is soft and easily broken, so that they have but few advantages to commend them for ornamental purposes, the chief one being their fast growth.

The poplars are found in temperate or northern regions, but range as far south as Northern Mexico and Lower California. There are nine species in North America, but their main habitat is toward the north. The poplar is the oldest type of dicotyledonous plants yet identified, being common in North America in the cretaceous period.

Perhaps the best known species generally in Canada is the Aspen Poplar (*Populus tremuloides*), known in the west as the white poplar. It springs up everywhere, especially after fires, and with its white trunk and light green shimmering foliage forms a beautiful contrast to the dark coniferous trees amongst which it grows. The trembling of the leaves is one of the most noticeable characteristics of this tree, and has given it its specific name. The peculiar movement of the leaves is occasioned by the fact that the petioles or leaf stems are flattened laterally, and as a result the slightest motion of the air causes them to tremble violently. As this is more or less characteristic of the poplars it may have

given rise also to the generic name of *Populus*, or people, as representing the restless, moving, whispering crowd of the populace. Glancing in the bright sunlight, nothing could be more beautiful than the tremulous motion of the leaves of the aspen, but to a person unused to the sound, nothing is more weird than the continual rustling and whispering of the foliage when the silence of night has fallen. To the uninitiated it is continual presage of a rain shower, or, if he be of an imaginative temperament, he may endow the trees with life and hear strange mutterings in an unknown tongue. There is a tradition that the wood of the cross was taken from this tree, and that it is in consequence of this that it is always trembling with shame. Among the French Canadians the aspen is regarded with a superstitious reverence, and they do not care to use it for ordinary purposes.

*Populus tremuloides* is the most widely distributed tree of North America, springing up easily everywhere, but the north seems to be its natural habitat, for there it reaches its best development. In Eastern Canada and the north eastern states it rarely exceeds fifty feet in height. In the western prairie region it reaches a height of sometimes one hundred feet, with as great a diameter as three feet at the ground, although the average is not more than twelve to eighteen inches. The wood is close-grained but soft, and neither strong nor durable. In the east it is made into wood pulp for the manufacture of paper, and in the west is employed for general purposes. It forms the most convenient fuel for many of the northern districts and has an important place in the economy of nature. Germinating quickly and growing rapidly, it forms a cover for denuded soil, and gives protection to the young trees of longer-lived species.

The leaves are broadly ovate and abruptly pointed at the tips. The edges are serrate with small teeth. The foliage is dark green on the upper surface, and in the autumn changes to a golden yellow, which lights up the sombre northern landscapes in a most beautiful way. The flowers, as with other species of the poplar, appear in the spring in aments or catkins, the fertile and infertile flowers being separate. The light bark often makes it difficult at a distance to distinguish this tree from white birch.

Growing commonly with the Aspen Poplar, but not so num-

crous, is the Large Toothed Poplar, *Populus grandidentata*, Michaux. This name suggests the most marked characteristic which distinguishes it from the aspen, namely the widely-spread teeth with which the edges of the leaves are prominently serrate. The bark is not as light in color, and the wood is light, soft and close-grained, but not strong. It is not considered as valuable a species as the first described, but is used for largely the same purposes.

In the Cottonwood (*Populus deltoidea*, Marshall; *Populus monilifera*, Aiton) the leaves resemble somewhat those already described. They are deltoid or broadly ovate, and the edges are coarsely crenate or bluntly toothed, being in this respect between the leaves of the aspen and the large-toothed poplars. The base is broad and usually truncate or straight, though sometimes heart shaped. The aments or catkins of the pistillate or fertile flower often reach a foot in length and their resemblance to a necklace has given occasion for the specific name, *monilifera* or necklace-bearing. This tree ranges from Quebec to the base of the Rocky Mountains, but it is on the western plains that it has been found most valuable. It was the chief dependence of the early settlers of the Western States, and is being found useful also in Western Canada. It has been distributed largely by the Forestry Branch of the Department of the Interior to farmers for setting out in shelter belts and woodlots. Good success has been had with it except in south-eastern Manitoba, where it has been found subject to rust. Growing naturally, it attains the best development in the river bottoms and moist, rather heavy soil is its favourite location. It is sometimes killed back by the frost, but this is probably the result of immature growth on account of wet seasons in the fall.

The cottonwood grows to one hundred feet in height and sometimes seven or eight in diameter. With its height and spreading head it makes a splendid shelter, and, as it grows rapidly, is soon sufficiently developed to make its effect felt. The wood is light, but it is useful for fuel and general purposes. The heartwood is dark brown and the sapwood nearly white.

Leaving the other native poplars for future consideration,

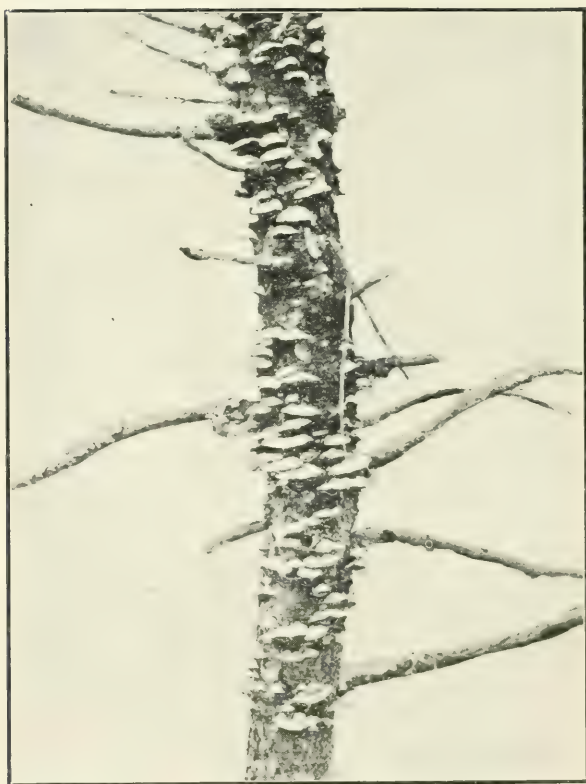




Needles of Black Spruce: four of them infected with rust.—Fig. 5



Black Spruce killed by rust —Fig. 6



“ Shelf Fungi ” on a dead Black Spruce.—Fig. 7

mention may be made of two introduced species which were at one time in great favour.

A row of Lombardy poplars (*Populus dilatata*) was a frequent feature of the agricultural landscape of Ontario and the Eastern States, and although it is practically useless for any purpose, the stiff, military appearance of a row of such trees made a striking and not unpleasing feature of the landscape. The Lombardy poplar, as its name indicates, was introduced from Italy, through France, was strongly advocated by Joseph Jefferson, and was soon distributed through the Eastern States and Canada. One reason for the favour it found was that its tall spire-like form was supposed to be a protection from lightning to the buildings in the vicinity, although the belief in its usefulness for this purpose has gone the way of the faith in the lightning rod. The characteristic upward growth of the branches gives this tree an unfailingly individual appearance which makes it easily distinguishable. They never spread, and a row of these trees requires only a narrow space. The leaf is rather broader than long, and tapers toward both ends, the point being long and sharp.

Another introduced tree is the White Poplar or abele. It was frequently planted as an ornamental tree and its foliage, dark green and shining on the upper surface and cottony underneath, gave it a very attractive appearance. But its persistent and troublesome habit of spreading by suckers, and the shower of down which covered the ground when the seeds were falling, has caused it to fall into disfavour. The leaves are easily distinguished by their lobed shape, much resembling the leaves of the maple.

The present season has not so far been marked by any great number of forest fires. In Cape Breton a fire occurred in the spring which threatened to assume serious proportions. During June, New Brunswick was visited with a fire that destroyed considerable timber, including some on Mr. Gibson's limits. It is reported that extensive fires have occurred on the Yukon River and on Prince of Wales Island. A recent fire has also taken place in the Temagami Reserve in Ontario, along the line of the Government Railway.

## NOTES.

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The report of the Commissioner of Crown Lands for Ontario for the year 1904, shows a total revenue from Woods and Forests of \$2,650,782; \$1,664,268 being received on account of bonuses, \$919,471 on account of timber dues and \$64,997 on account of ground rent. There were 318 fire rangers on duty in the forest exclusive of those in Algonquin Park and the Forest Reserves. The cost of this service for the year was \$82,589, of which the Department paid \$42,989.

Of the 318 rangers 290 were distributed over licensed territory, 12 on the Temiscaming and Northern Ontario Railway and 16 elsewhere on lands of the Crown not under license. The rangers along the line of the Temiscaming and Northern Ontario Railway were under the supervision of a Chief Ranger, who was clothed with magisterial powers, so as to try promptly any offenders against the Fire Act. A ranger was also placed on the construction of the branch of the Canadian Pacific Railway between Romford Station and Byng Inlet on the unlicensed lands, and one was on the head waters of the Missanabie and Moose Rivers, so as to post up notices on the portages and have a general supervision of parties using these waterways.

No serious fires occurred on licensed lands. There were two fires in the Temagami region, one near Net Lake, which would certainly have developed into a very serious fire had it not been promptly suppressed by the rangers on the spot. The other was on Horse Island in Lake Temagami, which was suppressed by the rangers in the reserve, which would no doubt have assumed very serious proportions had it not been suppressed by the rangers.

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The Superintendent of Algonquin National Park in Ontario reports that in 1904 the capercaillie introduced the previous year were seen in several places. They evidently made direct for the



heavy pine sections. Several of them were seen at different times during the summer by parties in different sections of the park. Two of the rangers reported seeing a mother with a very fine lot of chickens. They were enabled to examine them closely seeing them on two different occasions. The successful propagation of this famous Scotch grouse should be a great attraction to the park and will furnish a new and useful game bird in that district.

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The quantities of wood cut in the Adirondack and Catskill forests during 1904 were 699,287,760 feet, spruce leading with 161 million feet, hemlock 69 million, white pine 36 million and hardwoods 68 million. In the Adirondacks 481,876 cords were used for pulpwood, four-fifths of which was spruce. The consumption of wood for pulp has increased from 5,835,844 feet in 1890 to 289,125,600 feet in 1904.

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Of how much of the northern part of Canada can the same description be given as the following, from a report of the Geological Survey on a portion of the Rainy River district:—

“Comparatively a great part of the country embraced in the area mapped has been ravaged by fire within the last half century. These devastating fires, which do so much to mar the beauty of the scenery and destroy the timber, are too often caused by the carelessness of explorers, prospectors and hunters. The Indians are very careful to extinguish their fires during the dry season, but it is to be regretted that the fatal carelessness of others cannot be checked. The amount of valuable timber thus destroyed is mutely but strongly attested by the gigantic half-burned dead pines which, towering in the air, add so much to the wildness and desolateness of the scene. Where sufficient time has elapsed a dense second growth has sprung up, consisting, in places, almost entirely of jack pine, thickly clustered, sometimes of more thinly scattered birches and poplars, but generally of all three, with the addition of spruce. Frequent clumps of Norway pine often break the monotony of the burnt country. These trees remain unscathed, and where they are thickly clustered, have often arrested the progress of fires in that direction.”

A deputation of holders of timber licenses waited upon the Ontario Government some time ago, to present certain suggestions regarding the protection and conservation of timber. One proposal was that the Government should appoint inspectors to report upon the adaptability of localities situated within districts under timber license, and unless at least ten per cent. of a township is suitable for cultivation, such lands should not be open for settlement under the Free Grant and Homestead Acts, and if already open, should be withdrawn. Instead of a location certificate being granted, the deputation suggested that the applicant should not be located, but should be allowed only to enter upon the lands for the purpose of cutting and clearing and putting under cultivation the two or more acres prescribed by the regulations, building the house and residing upon the lands according to the requirements of the Act, and then, after the expiration of six months, upon furnishing the department with valid proof of residence and improvement, and of his having complied with the provisions of the Act, he should receive the location. The further provision should be made that he is not to be allowed to cut timber except in the actual process of clearing for cultivation, prior to the issue of his patent. The request was also made that rights of licensees to cut timber other than pine, where it is included in the licenses, be not made to cease upon the location as at present, but be suspended from the time of the location, to be revived on abandonment or failure of the locatee to comply with the regulations. Attention was also called to the resolution passed by the Lumbermen's Association, urging that the newer and unexplored districts should be explored in advance of settlement.

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Within the last two years a British Syndicate, in which the Harmsworths, who are among the leading newspaper publishers in England, are the prime movers, have been making enquiries with the object of acquiring control of pulpwood lands, and establishing a pulp and paper mill to supply their various enterprises in England. Having looked over the ground in all the eastern Provinces of the Dominion as far as Ontario, they finally came to the conclusion to locate in Newfoundland, the determin-

ing factors in the decision being apparently, in addition to an adequate supply of raw material, the advantage of having an ocean port free to navigation throughout the year, and the practical independence of railroad transportation. There may perhaps be the additional factor that it was possible to obtain a better bargain with the Government of Newfoundland than with the Governments of the eastern Provinces.

The Newfoundland Government has entered into an agreement with the Harmsworth Syndicate, the main provisions of which appear to be the following:—The corporation is permitted to secure a solid block of timbered land, containing 2,000 square miles, for 99 years without rental. The concession makes pulpwood free of dues, other timber being subject to a royalty of fifty cents per thousand feet. It also gives virtual ownership of the land with mineral rights. The company is required to spend a quarter of a million dollars during the first four years, and a million dollars during twenty years. Game and fish are reserved for the public, the natural migration of the caribou is to be left unrestrained and the right of way for roads, railways, telegraph and telephone lines is also reserved.

A strong agitation against the confirmation of this agreement arose in Newfoundland, and the bill has been fought at all stages, and appeal has even been made to the British Government for disallowance. The movement is strengthened by the fact that the bargain made in 1898 with the Reid syndicate, for the building of a railway across the island, gave away large public privileges, without the matter having been submitted to the people, and the feeling that the present agreement is a repetition of the same process.

One of the chief objections made to the bargain is that it does not specifically require the building and operation of a pulp mill within a fixed period, although the grantees are obliged to spend \$250,000 in and about the providing of water powers, and the erection of a mill or mills within four years. The reply of the Syndicate to this argument is that many exhaustive investigations have yet to be made as to mechanical and engineering data, and to force their hand might be to cause them to erect a mill that

might be useless, as they say has already occurred in Canada when such a provision was put into force.

The lawyer for the Harmsworths claims that an equally satisfactory explanation exists with regard to every other clause in the bill. His clients, he says, only sought an area extensive enough, and contained within a suitable watershed, to enable the forest growth to be cut scientifically and then reproduced by the most advanced methods of modern arboriculture, while it could be properly policed and protected so that its one substantial asset, from their view point, its standing timber, might be safe-guarded from every vagrant wanderer whose camp fire might destroy it in a single night. The possession of such an area assured to them, and satisfactory legislation to prevent bush fires enacted, together with such concessions as will warrant them in embarking in so large an enterprise in a new and untried country, and they will at once launch out in the establishment of a plant and accessories, which will reach five million dollars in a few years. They have all their plans now perfected for opening up work—engineers and experts engaged to make investigations as to the water powers, flow, ice drift, mill sites, dams and factories; surveyors ready to begin the mapping of the entire watershed; forestry experts to undertake the scientific re-foresting of the waste lands, where such can be done, and wood rangers to assume the task of patrolling the borders and seeing the region kept free from bush fires.

As the Newfoundland Government controls the customs as well as the land revenue, it may expect to obtain through the former source, consequent upon the trade development which the contract promises, a return for the concessions made, but it is hardly a wise Government measure to alienate large areas of the forest lands of the Colony, without at least a provision to ensure a direct revenue to the Crown. Stumpage dues would probably be the preferable method of such taxation, as it would thus only keep pace with the development. The future rights of the Colony should certainly be safeguarded in some way, the opportunity for development need not necessarily be set aside, and it is to be hoped that the statesmanship of the island colony will be strong and able enough to work out a solution that will make for its advancement and its future, as well as present, prosperity.



Mr. E. Stewart, Dominion Superintendent of Forestry, has just returned from a trip to Europe, which he made with the purpose of studying forest conditions and management in the more advanced countries of the old world. He visited the scientifically managed forests and the forest schools of France and Germany, and had the opportunity of meeting and discussing forestry questions with some of the leading foresters of those countries, and also Dr. Schlich and Sir Dietrich Brandis in England. The results of such observations will be of much advantage to Mr. Stewart in his administration of the Dominion forests.

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The same careful and methodical policy is being introduced in our colonial dominions. There the difficulties are sometimes very great, because the havoc has been more complete. We try, for example, to reinduce trees to give back to Southern Tunis its pristine fertility. Most of it is now a sand desert. What it was in Roman times we know by the ruins and the inscriptions. The capital of the South, Sufetula, as it was called, consists now in scattered ruins in the midst of absolute desert. One of the inscriptions discovered contains a description given by an old Roman veteran of what his villa was. He had retired there after his campaigns, and describes the trees, the plots of grass, and the fluent waters, which adorn his retreat—now buried under the shroud of the desert sand.

The Arab conquest destroyed all the trees there and killed the forest. The punishment was not long to follow. No forest there. No men. Not long after the conquest, the mischief was already considerable, the land was desolate, and an Arab chronicler, seeing the havoc done, recalled in his book the former times of prosperity, adding: "But in those days one could walk from Tripoli to Tunis *in the shade*."—*M. Jusserand, Ambassador from France, in Report of American Forest Congress.*

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The following communication has been received from Mr. W. B. Hoyt, of N. B.:—

"In your annual report for 1904, in a discussion on the distribution of forest seeds, p. 51, Mr. Bertram makes a remark

relative to the distribution of white pine seed, and, incidentally to be applied to other forest seeds, which I think, is very wide of the mark. Mr. Bertram says: "The seeds of the white pine get blown out of those positions....and are carried far and near over the country....That is the only way white pine seed can distribute itself."

Now there is no doubt that a considerable distribution takes place in this way to near points, but it would only be in an exceptional hurricane that these seeds would carry a mile, or even half that distance.

I think that there is a strong similarity in the methods by which the seeds of the coniferous trees are distributed, so that what will apply to spruce or fir will apply to pine. Now, in my opinion, one important source of distribution is by animals. We know that it is a common habit for squirrels to carry their food to a fallen tree for consumption. We see this done everywhere; it is very rarely that they eat sitting on the ground. Generally they perch on a fallen log or a branch. Now I have frequently noticed a dense growth of sapling spruce or fir in the immediate vicinity of a fallen tree—in many cases you can trace this clump for the full length of a fallen trunk, showing that it has at some time been the favourite feeding ground of a family of squirrels. These squirrels are in turn devoured by owls, foxes and other carnivora, and large quantities of undigested seeds are deposited in their excreta; and as many of them roam over a large field, this method becomes an important source of distribution.

But probably the most important source of distribution, and one, the study of which will lead to the most practical results, is that effected by the spring floods. The seeds dropping on the earth or on the snow, in the early part of the season, are carried by the rivulets which form in the melting of the snow, and are distributed along their entire course, many of them being carried into the larger streams and deposited over large submerged areas in the spring.

The consideration of this mode of distribution should be an important factor in the selection of forest reserves, as, in this way, areas selected on a watershed form not only a kind of re-

servoir for the more equal distribution of the rainfall throughout the year, but act, also, as a natural nursery, producing and distributing a form of flora naturally adapted to the locality.

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The Annual Report for 1904 of the Department of Waters and Forests of France furnishes some interesting figures. The area of state forests is 1,169,820 hectares or 2,911,625 acres. The financial returns for 1903, the last available, were 29,373,903 francs or \$5,874,780, an average of about \$2.00 per acre. The product of the wood cut was 21,247,520 francs, and from other sources 8,126,383 francs. The value of the wood imported into France in 1904 was 167,400,000 francs and the export 53,900,000 francs, leaving an adverse balance of 113,500,000 francs.

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The Moosomin, N.W.T. town council, wishing to encourage tree planting upon the streets by private citizens, has passed the following by-law:—"All property owners or tax-payers, who plant trees on the streets, not less than eight feet from the street line, good, healthy maples, ash, or elm, of a size at least two inches through in the trunk, and not less than twelve feet high,—for every one in every twelve and a half feet so planted shall be paid the sum of fifty cents each."

The conditions are that the trees are to be properly planted and staked, and to be to the satisfaction of an inspector appointed by the council. The inspection is to be made in July of the year following the planting of the trees. At the time of the inspection, if the trees are found in a healthy, growing state, the inspector shall issue to the property owner or taxpayer, a certificate of 50c. for each growing tree. This certificate is to be accepted in lieu of cash by the tax collector for the sum specified, when the property owner or tax-payer is paying his taxes for the year in which the inspection is made.

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Nearly all the developed mines of the Black Hills are large deposits of comparatively low grade ore, either free milling or cyaniding in its character; frequently both processes are com-

bined in the extraction of the values from the ore. In the successful prosecution of the work required to make a mine productive and remunerative to the owners, the use of timber is an absolute necessity. Its uses are varied. It is required to timber the shafts through which the ore is drawn to the surface. Heavy timbers are also required to take the place of the ore mined, to hold up the roof of the workings, and sustain the sides of the stopes and drifts. The place of every supporting atom taken from the interior of a mine must be filled by some other material which can carry the burden with safety to the lives of the miners employed. This requires timber from the forest. No other material can be substituted for it. The use of iron or steel posts and beams is prohibited by their cost, to say nothing about their inadaptability to the work of underground mining.

It can be truly said that a veritable forest has been used underground in the mines of the Black Hills during the few years they have been in operation, that no more of the forest has been used in their development than has been absolutely necessary, is doubtless true. The grade of the ore, the high wages paid, and the satisfactory returns received in most cases on the investment, prove that the mines have been most economically managed, the timbering being one of the heaviest items of expense in their operation.—*Seth Bullock, Supervisor of the Black Hills Forest Reserve, at American Forest Congress.*

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The report of the Swedish Forest Department, for the year 1903, gives the total area of the forests under charge of the department at the close of that year as 16,394,944 acres, or about half the area of England. Of this area, however, about 2,069,475 acres were woods in the hands of communes or other authorities who had the right to the revenue of these lands, so that only the proceeds of about 14,325,469 acres were paid in to the Department. From these 14,325,469 acres must also be deducted 862,023 acres, the revenues of which were handed over to the ecclesiastical authorities, leaving only 13,463,446 acres as the area of the State Forests proper. The latter gave a gross return of 8,673,224 kronor for the year 1903. The cost of management, which included the



making and improvement of roads and the clearing of waterways for floating, etc., amounted to 2,445,532 kronor, leaving a net profit of 6,228,002 kronor, or roughly \$1,700,000, being about thirteen cents per acre. It must be borne in mind, however, that the great bulk of the Swedish State Forests are situated in the extreme north of the country where the growth of conifers is slow, and where there are large expanses made up of marsh and other non-forest-bearing ground. Allowance is evidently made for this in the estimate of the value of the Swedish Forests, which is placed at about \$26,500,000, or \$2.00 per acre, as in the southern part of Sweden which supplies the bulk of the contribution to Great Britain and that of the best quality, \$25.00 an acre is not an uncommon price for denuded forest lands.

---

The following is a copy of a resolution adopted by the Central Farmers' Institute of the Province of British Columbia:—

“Whereas, the delegates of the Central Farmers' Institute in convention assembled are of the opinion that the conservation of the forest wealth of the Province, one of the principal sources of wealth and bearing as it does so intimately on the agricultural interests, is of the first importance,

Be it therefore resolved that the Government be asked to use all means in its power to prevent destruction of forests, whether by fire or by wasteful methods of lumbering,

And be it further resolved that the Government be asked to use its influence with the Dominion Government, or otherwise, to make a reserve of a tract of forest as a National Park to the end that at least a remnant of our original forest may be reserved for posterity,

Resolved, that in the best interests of the country, it is desirable that reserves should be made of forest lands.”

---

Russia seems to find the forest a certain resource to fall back upon in time of financial stress, much in the same way as some of the Canadian provinces. It is stated in Russian newspapers that in view of the financial difficulties in which the Government is

situated, owing to the war and internal discord, the Forestry Department of the Ministry of State Domains has been authorized to sell large quantities of timber in the Province of Vologda, for shipment from the Petchora. At present, only two sawmills are said to be working there. It is expected that as a result of the financial burdens of the war, it will be necessary for Russia to exploit her forests to a large extent, and this may be expected in the forests of the White Sea district for the export trade.

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The St. John River is the scene of a dispute which has assumed international proportions, inasmuch as it is based on an international agreement, that no obstruction should be allowed to the free navigation of the portion of the river which forms the boundary between the United States and Canada. A great many logs, cut on the upper part of the St. John River in Maine, are sawn at the mills in New Brunswick on the lower reaches, particularly at St. John. One of the firms operating on the Maine side where the river is the boundary, has built a dam so as to direct the logs into the pond for sorting, and, although the logs belonging to mills lower down are afterwards sent on, the owners object to the delay and consider the dam an interference with the stream in contravention of the international agreement. An effort has been made to include the difficulty in the disputed matters to be taken up by the International Waterways Commission.

## REVIEWS.

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*Report of the Dominion Superintendent of Forestry, 1904.*

*pp.* 28.

The succeeding reports of the Dominion Forestry Branch tell a story of steady progress. The distribution of trees to farmers in the West reached the number of 1,800,000, bringing up the total distribution to 3,242,750, while the stock in the nurseries is 4,229,557. The satisfactory character of the work done in the setting out of these trees is shown in the fact that the percentage of success is from 80 to 95 per cent. Two special phases of forestry work of the utmost importance to Canada are emphasized by Mr. Stewart in the following paragraphs, which are well worthy of quotation:—

“The early history of Canada is much enlivened by the accounts of the journeys of the pioneer explorer into hitherto unknown regions. The explorer and the missionary during the French regime went hand in hand, and their names are written far beyond where the settler of to-day has yet gone, but private exploration is a thing of the past. Men to-day are too busily engaged in personal advancement to permit of the gratification of a spirit of adventure if such should exist, and the result is that we know practically as little of the heritage we possess beyond the settled districts as we do of Africa or Australia. It is true that the Geological Survey has done all that could be expected of it with the limited means at its disposal, but it seems to me that the day has now come when the people of the country should have the means of knowing the character and natural resources of their own unoccupied possessions. The government should know in advance of settlement the character of the unsettled districts, so as to direct immigration aright; so that mineral lands might be set aside as such; agricultural land devoted to the agriculturist, and land unsuited for agriculture but on which timber is growing reserved permanently for timber.”

"The protection of our natural forests is a matter of supreme importance to the whole country, and one that has been almost neglected in the past. The spectacle witnessed by the traveller passing through our unsettled forest country is sad indeed. On every hand he beholds the charred remains of the old time forest. He sees this as he journeys through Nova Scotia, New Brunswick, Quebec, Ontario, the Northwest Territories, and, sad to say, this destruction is not least if not greatest in the giant woods of the Pacific slope. Everywhere this destruction of public property is before his eyes, and it is humiliating to confess, as we must do, that the fires which caused this great loss were not only permitted but in some cases caused by our own people. The settlers in these regions on the one hand laboured with all the energy characteristic of the backwoods pioneer to create wealth, while on the other hand they lighted the torch which resulted in greater loss to the country as a whole than was caused by all the conflagrations that have ever occurred in our settled districts."

The Forestry Branch has now secured land in the vicinity of Indian Head for the location of a forest nursery which will be entirely under its control. This is described in the report of Mr. Ross, the Assistant Superintendent. Mr. Ross also mentions the species of trees that have been found most successful as follows:

"On the whole the trees sent out have done exceedingly well, and with only a few exceptions are carefully attended to. In the reports of the inspectors a more detailed account will be given of the success of the different varieties in each district. The maple, elm, ash and willow seem to do well over the whole of the West. From recent reports the cottonwood in south-eastern Manitoba does not seem to be entirely satisfactory, but in other districts it appears to be the fastest-growing tree we have. The cottonwood is a tree which seems to thrive best on the heavier soils and in moist places. In south-eastern Manitoba, however, the main difficulty seems to be with a rust fungus which affects the foliage; but the district where this is prevalent seems at present to be very limited. The cottonwood too is looked upon with disfavour by many on account of its killing back in the winter. This, however, does not seem to affect the growth of the trees to any extent in the majority of cases. The wet falls



of recent years and the consequent late growth, which does not give the young shoots an opportunity to ripen before the heavy frosts, account no doubt for the rather large amount of killing back during the past seasons. After the trees are three or four years old the winters do not seem to have any effect on them, at least the older trees on the experimental farm here have shown no sign of killing back for several years.

"The Russian poplar we do not distribute very much, as it has been found that after they get to be a few years old they become subject to the attacks of borers and fungi. Mr. Mitchell reports that two-year old trees planted at Gleichen in Alberta and at other points are already being affected by this fungus. When the trees are young it seems to attack the stem at the point where the root commences, and rots the outer wood and the inner layer of bark, thus destroying the circulation of sap.

"The elm and ash, especially the latter, seem to be coming into more general favour. They are both very hardy and are longer lived and produce better timber than either the poplar or willow, although they are slower in growth. The ash is very readily raised from seed, the elm not quite so easily, the seed being scarcer, and, unless sown under proper conditions of soil and moisture, it does not seem to germinate at all evenly; hence we cannot distribute this variety in such large quantities as either the maple or ash, although it is without doubt the best broad leaf tree we have."

The reports of the Inspectors of Tree Planting and of the forest protection officials are appended and give much detailed information.

---

*Forestry Affairs in New York, 1904. Col. Wm. F. Fox,  
Superintendent of State Forests, Albany, N.Y., 28 pp.*

The reports of the New York Forest Commission are always interesting on account of the material they contain and the close resemblance between the conditions there and in parts of Canada. New York State was fortunate in the little damage done by fires during 1904, the total loss to state timber being only

\$81. One of the worst fires was started from a railway operated by a lumber company and resulted in a loss to the company of \$5,000.

In reforestation work a hardwood plantation of some 70 acres was set out consisting of red and pin oak, chestnut, black locust and black walnut. The seedlings were planted seven feet each way instead of four feet as is usual with conifers. The scattering of the seeds of coniferous trees was also tried and the question is one of so much importance that the paragraphs in regard to it are worthy of quotation in full:—

“Another tract was sown with white pine by the seed-spot method. The land selected for this purpose is in Essex County, near the highway running from Lower Saranac Lake to Lake Placid. The growth on this site was so uneven, rough, and overgrown with scrubby brush that the planting of seedlings at regular intervals was not practicable. The seed-spot method consists in breaking up the ground in small circular spots, about two feet wide, and at intervals of eight feet each way, or as near that as the obstacles will permit. A few seeds, ten or twelve, are scattered on the freshly turned ground and lightly covered with earth. When the seedlings thus propagated are two years old they are taken up, with the exception of one which is allowed to remain; the others, so far as needed, are set out immediately in the intervening spaces close at hand, forming thereby a plantation with intervals of four feet each way between the plants. The seed-spot method, owing to its smaller expense, is used also on smooth, level ground, in which case the patches are made at the smaller intervals on the start, thus saving any subsequent transplanting into the spaces.

“Another small tract near the Lake Placid road was sown with white pine seed, scattered broadcast. This method is also preferable on ground where seedlings cannot be set out with advantage, and furthermore, it is the cheapest way to reforest denuded lands. But it has its disadvantages as well; the seeds are often eaten by birds or rodents; and, under the most favourable circumstances, the germination is very apt to be uneven, the sprouts coming up thickly in some places, and scarcely at all in others.

"Still, the broadcast sowing of native spruce, in 1902, under the poplar groves near Aiden Lair, in Essex county, was successful in every respect. Forester Knechtel, who did this sowing, was instructed to make a careful examination of this ground last spring, and make a report on the result. He found the surface under the young poplars—trees twenty-five feet high—thickly covered with little spruce seedlings, and his report was so encouraging that broadcast sowing will be undertaken on a large scale as soon as we can gather a supply of seed from our native spruce for that purpose. The experiment at Aiden Lair indicates that the numerous areas of poplar forest which now cover many of the old burns can be successfully underplanted with red spruce."

The methods followed in obtaining a supply of seed also give useful data and are described as follows:—

"The year 1904 was a seed year for white pine in New York, and so arrangements were made for gathering a supply, as this species produces seed only at intervals of four or five years. An examination of the pines in Northern New York was made by our foresters last year, when it was found that the little cones which require two years maturing, were forming to an extent that indicated a seed year for 1904. As the native red spruce and Norway pine did not bear cones this year the work of seed gathering was confined to white pine.

"Work was commenced early in September, before the scales on the cones had opened, and a supply was gathered between the 6th and 18th of that month. The men and boys employed were paid 30 cents per bushel delivered in sacks at Willsboro, at which prices they made good wages. At the start only 25 cents was paid, but as other parties on the ground were offering 30 cents per bushel, Mr. Pettis was obliged to pay the same.

"The cones were thrashed and dried in a barn near Willsboro, rented temporarily for this purpose, after which the seeds were cleaned and winnowed in a fanning mill of the kind used by farmers."

"A bushel of white pine cones yield on an average a little over one pound of clean seed, which contains about 29,500 grains.

As the foresters received 500 bushels of cones they secured over 500 pounds of clean seed. This supply cost  $47\frac{1}{2}$  cents per pound, not including the forester's expenses or the purchase of some material which was charged to the permanent plant, and is available for future work of this kind. As the market price of white pine seed runs from \$2.50 to \$4.50 per pound, according to the absence of a seed year and its scarcity, it will be seen that the work was timely and economical."

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*Proceedings of the American Forest Congress.* H. M. Suter Publishing Co., Washington, D.C.—pp. 474.

The Report of the Proceedings of the American Forest Congress held in Washington, in January, has been issued. It includes the papers which were read at the Congress and impromptu addresses delivered in the course of the discussion, and altogether is the most complete exposition of the forest problem as it affects the United States, which has yet been placed before the public. The type is clear and easily readable, and the general appearance of the volume is creditable to the publishing firm. Elsewhere are quoted some extracts from a few of the papers.

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*A Primer of Forestry. Part II—Practical Forestry.* By Gifford Pinchot. Bulletin No. 24 of the U.S. Bureau of Forestry.

The second volume of the Primer of Forestry, by Mr. Gifford Pinchot, Forester to the United States, has been received. In the first volume the subject was "The Forest." In the present volume the purpose of the work has been further developed in a discussion of "Practical Forestry," which the author defines as follows:—

"The object of practical forestry is precisely to make the forest render its best service to man, in such a way as to increase rather than diminish its usefulness in the future. Forest management and conservative lumbering are other names for practical forestry. Under whatever names it may be known, practical forestry means both the use and the preservation of the forest."



Mr. Pinchot first discusses the uses of the forest and the silvicultural systems at present in use in different countries, and then passes on to consider work in the woods under the divisions of Conservative Lumbering and Planting. The effects of the forests on climate and temperature are the subject of a separate chapter, and the concluding section gives a sketch of the history of forestry abroad and at home. The two volumes form a complete and simple exposition of forestry as it is advocated by its most reliable exponents at the present time.

---

*Canadian National Park, Rocky Mountains.*—pp. 63.

In the last number of the Forestry Journal was noted the issue by the Department of the Interior, of a pamphlet descriptive of the Canadian National Park in the Rocky Mountains and there were reproduced two of the colored illustrations therefrom. The Park is situated on the eastern slope of the Rocky Mountains, and comprises an area of 5,732 square miles or 3,668,480 acres. Within its bounds is found a great variety of grand and beautiful scenery of river, lake and mountain. It includes, also, the hot springs at Banff, which are a great attraction to tourists. A large part of the park is forest clad and is given efficient protection from fire by the authorities. Its chief objects, however, are as a pleasure resort, and as a protection to the watershed, and to fish and game. The pamphlet is fully illustrated and its make up is a credit to the Department and to the Rolla L. Crain Company, of Ottawa, from whose office it issued.

---

*Report of the Michigan Forestry Commission, 1903-04.*—pp. 200.

This report, in addition to the summary report of the Commission, contains a number of papers on special subjects relating to forestry by some of the leading supporters of the movement in the State of Michigan. There are also included the laws of the State concerning forests and forest fires, and the Forest Reserve Manual.

The Commission have charge of the State Forest Reserves, which comprise an area of 34,000 acres. These Reserves consist mainly of light sand lands, interspersed with swampy areas. All the lands were at one time heavily timbered and in the swamps there is still a good stand of cedar and tamarack, interspersed with spruce, pine and other trees. On the higher lands lumbering operations, with their usual debris of tops and branches, were followed by fires, recurring at intervals, which, in time, destroyed all the forest growth and left it to the tenacious shrubs, such as sweet fern, blackberry, etc. Oak sprouts are still, however, found coming up from the stumps and where a few fire-scarred pines remain there are some scattered pine seedlings. Jack pine and Norway, or red pine, are the characteristic trees of most of the area, although white pine also occurs. Protection against fire has been provided for and some fifty acres have been planted with white pine, Norway spruce and Scotch pine, purchased from dealers, and these show a good percentage of success. Provision has been made for a nursery on the reserve which will assist in cheapening the cost of the work to a great extent.

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# CANADIAN FORESTRY JOURNAL.



OCTOBER  
1905



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



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## THE objects of THE CANADIAN FORESTRY ASSOCIATION are:

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary.

**R. H. CAMPBELL.**

OTTAWA, ONT.

*Department of the Interior.*

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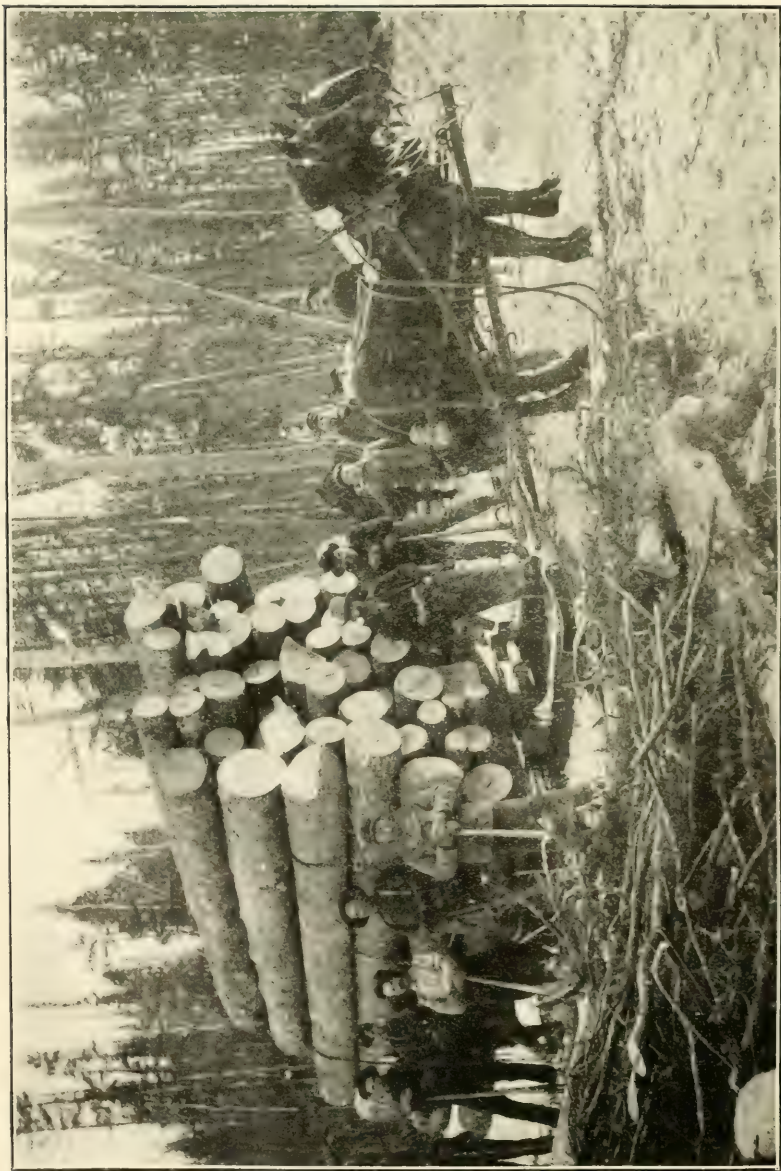
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The Woods North of Prince Albert, Saskatchewan (See p. 175.)

*Photo by W. J. James, Prince Albert.*

*Frontispiece.*

# Canadian Forestry Journal.

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VOL. I.

OCTOBER, 1905.

No. 4

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## CANADIAN FORESTRY CONVENTION.

OTTAWA, 10th, 11th and 12th JANUARY, 1906.

### OFFICIAL CALL.

*Office of the Prime Minister of Canada,  
Ottawa, 21st August, 1905.*

*To the Public of the Dominion of Canada:*

Canada possesses one of the largest areas of virgin forest of any country in the world and is ranked by European experts first, or among the first, of the important sources of the world's timber supply for the future.

The preservation of the streams in perennial and constant flow, which is largely controlled by the forests on the watersheds, will have an important influence on the industrial and agricultural development of the Dominion. The expansion of our electrical and mechanical industries will be regulated to a great extent by water, which forms the greatest source of power in all countries, and some of our western districts are dependent on irrigation to ensure the success of agricultural operations.

In all the older provinces the clearing of the soil has been carried to such an extent that the ill effects on the water supply and on agriculture are clearly marked, while on the western prairies the need of sheltering trees for houses and fields is seriously felt by the settlers.

The early construction of the Transcontinental Railway, and of other railways, through our northern forested districts and the consequent opening of those districts to general traffic, will increase the danger from fire which has already been a most active agent of destruction.

These conditions are not new; they have from time to time received public attention, and during the Session just closed Parliament authorized the summoning of a convention for the more thorough discussion of the same.

I therefore hereby call a public convention to meet in the City of Ottawa on the 10th, 11th and 12th of January, 1906, under the auspices of the Canadian Forestry Association, and to this convention are specially invited:

Members of the Senate and House of Commons,  
Lieutenant-Governors of the Provinces,  
Members of Legislative Councils and Legislative Assemblies  
of the Provinces,  
Dominion and Provincial Forest Officials,  
Members of the Canadian Forestry Association,  
Representatives of Lumbermen's Associations,  
Representatives of Boards of Trade,  
Representatives of Universities,  
Representatives of Agricultural Colleges,  
Representatives of Farmers' Institutes,  
Representatives of Railway Companies,  
Representatives of the Canadian Mining Institute,  
Representatives of the Canadian Society of Civil Engineers,  
Representatives of Associations of Land Surveyors,  
Representatives of Fish and Game Associations, and  
All others who take an interest in Forestry.

An invitation is also extended to the Bureau of Forestry of the United States, the American Forestry Association and the State Forestry Bureaus and Associations to send representatives to this Convention.

WILFRID LAURIER.



In accordance with the official summons issued by the Right Honourable the Premier of the Dominion, arrangements have been made for a Canadian Forestry Convention to be held in Ottawa on the 10th, 11th and 12th of January next, to consider the forests of the Dominion and their national importance.

This Convention is held under the auspices of the Canadian Forestry Association and the organization and carrying out of the project has been placed in the hands of the Association.

The subjects to be considered at the Convention will be discussed under the following divisions:—

1. The Nation and the Forest.
2. Forestry in relation to Agriculture and Irrigation.
3. The Forest and the Lumber and Pulp Industries.
4. The Relation of our Forests to our other Industries: Railways; Water Powers; Mining; Building Trades; Wood Working Manufactures.
5. Scientific Forestry and Forestry Education.

By the kindness of the Canadian Railway Companies a single fare rate over their roads on the certificate plan will probably be allowed delegates, regardless of the number in attendance. In regard to rates on railways in the United States, announcement will be made later.

Fuller announcement will be made later to the members of the Canadian Forestry Association by circular and for further particulars application may be made to the Secretary of the Convention.

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| Hon. W. C. Edwards,<br>President, Quebec Limit Holders' Assn.                               | Hon. A. J. Tugeson,<br>Commissioner of Lands and Forests,<br>Quebec.                        |
| Chas. M. Hays,<br>General Manager, Grand Trunk Railway.                                     | Hon. R. F. Green,<br>Chief Commissioner of Lands and Works<br>for British Columbia.         |
| Hon. S. N. Parent,<br>Chairman, Transcontinental Ry. Commis.                                | Hon. Arthur Drysdale,<br>Commissioner of Crown Lands for Nova<br>Scotia.                    |
| Hon. Simon Monteith,<br>Minister of Agriculture for Ontario.                                | J. R. Booth,<br>Ottawa.   |
| Hiram Peterson,<br>President, Hawke's Bay Lumber Co.  | Hon. A. B. Warburton,<br>Charlottetown, P.E.I.  |
| Hon. J. H. Agnew,<br>Commissioner of Lands for Manitoba.                                    | B. E. Walker,<br>General Manager, Bank of Commerce.   |
| Hon. F. J. Sweeney,<br>Surveyor-General of New Brunswick.                                   | F. W. Jones,<br>President, B. C. Mountain Lumbermen's<br>Association.                       |
| John Hendry,<br>President, B. C. Lumber and Shingle<br>Manufacturers' Association.          | Wm. Saunders, LL.D.,<br>Director of Dominion Experimental<br>Farms.                         |
| Rev. A. E. Burke,<br>Vice-President, Canadian Forestry Asso-<br>ciation, Edmonton, P. E. I. | J. S. Dennis,<br>Director of Immigration for the Canadian<br>Pacific Railway Company.       |
| H. M. Price,<br>President, Quebec Papermill Association.                                    | Monsignor J. U. K. Lafamme,<br>University of Laval.   |
| Dr. Robert Bell,<br>Director of the Geological Survey of<br>Canada.                         | F. C. Whitman,<br>President, Western Nova Scotia Lumber-<br>men's Association.              |
| Aubrey White,<br>Hon. President, Canadian Forestry Assn.                                    | Wm. Pearce,<br>Vice-President, Canadian Forestry As-<br>sociation, Calgary, Alberta.        |
| E. G. Joly de Lotbinière,<br>President, Canadian Forestry Assn.                             | Norman M. Ross,<br>Assistant Superintendent of Forestry for<br>Canada.                      |
| E. Stewart,<br>Dominion Superintendent of Forestry.   | F. D. Wilson,<br>Vice-President of the Canadian Forestry<br>Assn., Fort Vermilion, Alberta. |
| M. J. Butler, C.E.,<br>Deputy Minister of Railways and Canals.                              | J. L. Campbell,<br>President, Western Lumbermen's As-<br>sociation.                         |
| Cecil B. Smith, C.E.,<br>Chairman, Temiscaming and Northern<br>Ontario Railway Commission.  |   |
| Thos. Southworth,<br>Director of Forestry for Ontario.                                      |   |
| Dr. Judson F. Clark,<br>Forester for the Province of Ontario.                               |   |

Secretary: R. H. CAMPBELL,

Secretary of the Canadian Forestry Association,  
Department of the Interior, Ottawa.

## THE MONTREAL FOREST CONGRESS,

21ST, 22ND AND 23RD AUGUST, 1882.

The calling of the Canadian Forestry Convention for January next, naturally turns attention to the Forest Congress, held in Montreal in 1882, which was the first great meeting to deal with the subject of forestry held in Canada. It was in fact a joint meeting of the American Forest Congress and the American Forestry Association, two separate Societies for the advancement of forestry, and it resulted in a junction of their forces. The selection of Montreal as a meeting place was the result of an invitation given by several Canadians who attended a previous meeting at Cincinnati.

For the organization and success of this meeting, while credit is due to many, the most active part was taken by Mr. Wm. Little, of Westmount, who was the Vice-President of the Congress. He not only gave unsparingly of his time and energy, but also personally bore the greater part of the expense, including the publication of a special edition of the *Montreal Herald*, containing a report of the proceedings and the papers in full. It is to a copy of this special issue that we are indebted for the information from which this article is compiled. Mr. Little is still as strong a supporter of the movement as ever and has held the office of both President and Honorary President of the Canadian Forestry Association.

In looking over the report and the names of those in attendance one is struck with the way in which it links the present with the past. Some of those whose names appear are still prominent, some have passed into history. Among those on the local committee were Hon. (now Sir) H. G. Joly, Principal Dawson, Joseph Doutre, Professor Harrington, G. L. Marler, Hon. A. W. Ogilvie, Sir Hugh Allan, Hon. Louis Beaubien, S. E. Dawson, Hon. John Hamilton, Sir Francis Hincks, Dr. T. Sterry Hunt, James Little, Hon. E. H. Spring-Rice, J. C. Ward, N. S. Whitney, A. T. Drummond. Others who were present were: Dr. B. E. Fernow, J. R. Booth, J. G. H. Bergeron, E. H. Bronson, Hon. Geo. Bryson, W. C. Edwards, Rev. T. W. Fyles, Dr. Wm. H. Hingston, Robt. Hamilton, T. C. Keefer, Jas. Mills, W. G. Perley, A. E. Russell, Wm. Saunders, G. W. Stephens, Peter White, Hon. J. S. C. Wurtele, E. E. Taché, W. R. Thistle.

The papers presented covered a variety of subjects relating to forestry, some of a scientific nature, others descriptive and some dealing with practical applications of principles.

Some were presented by lumbermen, others represented the agricultural interests. Many of them were very valuable, though there was in others considerable more of theorizing than of actual experience. Even these latter, however, were suggestive and at least showed interest and enthusiasm. Several descriptive of the trees of different classes or districts gave useful information for reference purposes. Canada was largely represented on the list.

On Monday evening a meeting of a more popular character was held at the Queen's Hall. At this meeting an address was given by Hon. Henri Joly. Mr. Joly stated that the timber supplies of Canada were considered inexhaustible, and therefore it was difficult to arouse interest on the question. He, however, pointed out that the lumber that Canada supplied to England was not one-fourth of the import while what was sent to other parts of Europe was but as a drop in the sea, and yet cutting had so far advanced that it had reached the height of land between the St. Lawrence and Hudson Bay. Mr. Joly thought that not only should the forests in existence be protected but that something should be done to plant trees where they did not now exist. He instanced his own experience with a forest tract of 100,000 acres. From this he turned out 35,000 to 40,000 spruce logs every year, and by following the rule of not allowing any tree under twelve inches in diameter to be cut he expected to have a supply of spruce in perpetuity. A little joke by Sir Henri, which will be appreciated by anyone conversant with the history of the Province of Quebec, and which was received by the audience with laughter and applause, is well worth repeating, although it contains a heresy according to what are usually accepted as orthodox forestry ideas. Mr. Joly said that some people were of the opinion that our Governments should take hold of this matter as men's lives were too short, but he could assure them that if men's lives were short Government's lives were generally still shorter.

The principal address of the evening was made by F. B. Hough, Chief of the Forestry Division of the United States, and was too comprehensive for any attempt at summary. His statement of the principle on which the question of forestry should be approached is worthy of quotation. He said:

"It has often been said, in a way intended to be amusing, that 'posterity has done nothing for me—why should I care for it?' Now, this is neither wise nor witty. It is not wise, because it is foolish—nor witty, because, like an oft told tale, it has lost all novelty and is at best but a stale and silly joke.

"It is part of true wisdom to look upon this beautiful earth as held by us in trust—it is, at best, only a life lease that a man holds to the estate for which he holds an absolute deed of pos-



session—and it is our solemn duty to so manage this trust as not to dissipate its value or perhaps render it wholly incapable of restoration.”

A suggestion made by Dr. Hough, which has perhaps had effect on the policy followed in Canada, was that experimental stations for the testing of trees on the plains of the West should be established. As Dr. Saunders was present at the meeting this hint may have been the starting point for the useful experimental work which has since been done in the Canadian West.

In a paper from the standpoint of the lumbermen Hon. J. K. Ward, of Montreal, pointed out what he considered to be improvements required in the management of the forests. Emphasizing the need of providing for the best use of the standing timber, both by protection and utilization, he made the suggestion: first, that there should be greater economy in manufacturing, both in the mills and in the woods, turning to better account the slabs, &c., in the former, and discouraging the making of square timber as much as possible in the latter; second, that on government lands the law as applied to pine should extend to spruce and tamarack, i.e., that no tree less than 12 inches at the stump should be cut down for commercial purposes; third, that fire should be more closely watched. On the last point the suggestion was made that the Government, which is most interested in the preservation of the forests, should employ as many men as are thought necessary in each agency to look after and trace the origin of fires on the public domain, giving them the power to take evidence so as to bring to punishment those who either wantonly or carelessly set fire to or cause the destruction of valuable property. In regard to settlement Mr. Ward urged that no lands unfit for settlement should be offered for sale and stated his view that in selling lands to settlers it should be made a condition of sale that twenty acres in every hundred should be given free, and that it should be forever kept as woodland.

A special committee had been appointed at a previous meeting to report on forest fires. The report submitted by this committee pointed out the damage done by forest fires. It said that the fires raging season after season through the forests have caused a greater and more irreparable destruction, inflicting deeper harm than the combined lumber industries of the past and the present day. The harm done was not only to the timber but to the soil, the constantly recurring fires resulting in the total destruction of every particle of organic matter in the surface soil, reducing it to a state of aridity and barrenness. The report did not make any suggestion as to a remedy. From several of the lumbermen in the convention, however, there

came practical suggestions on this question. The most complete statement was made by Mr. Peter White, M.P., of Pembroke, and may be quoted as one of the most important results from this Convention was the raising of and the suggestion of a means of solving the problem of protection of the timber from fire. His statement was as follows:—

Experience showed that the forest fires along the Upper Ottawa occur between May and August, those months inclusive, and his suggestion was to prohibit the starting of fires for clearing or other purposes within these four months. He would also suggest the division of the timber lands into districts each under the guardianship of a policeman resident within it; one duty of such functionary being to visit every settler towards the close of winter, say some time in March, to give him all necessary information and caution as to the requirements of the law in regard to this matter. He believed that there was very little incendiarism in the lumbering regions and that the bulk of the fires that occurred originated in ignorance and carelessness. Officials such as he had suggested the appointment of, ought to keep a careful watch at all the principal avenues of districts liable to be laid waste by fire. He thought that the estimate offered of the loss by this cause, as compared with the product the lumbermen secured, was far too moderate; he believed it would be nearer the mark to say it was ten to one, than to represent the two as approximately equal. As to precautions it might be urged that as the lumbermen had so large an interest at stake they might be looked to to provide the necessary precautions. That was true in a sense, and he had no doubt that those concerned would willingly submit to the imposition of a small tax, if necessary, for the purpose of securing the required protection. The firm with which he himself was associated had for years looked after their own interests in this matter, but it was obvious to every one that it was out of the power of private individuals or business firms to act with the authority and force which the Government could command.

The discussion was continued by Hon. Geo. Bryson, Mr. Thistle, of Ottawa, Hon. J. K. Ward and others who supported Mr. White's statements, and on motion of Hon. Mr. Joly a committee was appointed to formulate recommendations to the Governments on the subject.

To complete this phase of the Convention's work it may be added that the resolutions submitted by this committee were as follows:—

(1) The reservation of all pine and spruce lands unfit for settlement for lumbering purposes exclusively.

(2) The prohibition of burning brush by settlers in the vicinity of fir trees during May, June, September and October.

(3) The division of timbered country into districts, and the appointment of forest police, under a superintendent with magisterial powers, whose duty it shall be to detect and punish offenders and provide for the extinguishing of fires.

(4) The cost of maintenance of this protective force might partially be met by the imposition of a moderate tax on the parties owning or leasing timber lands.

Mr. Wm. Saunders, of London, (now Dr. Wm. Saunders, of Ottawa), read a paper on "The Growth of Poplar Trees for the Manufacture of Paper and Charcoal." Dr. Saunders spoke of the extensive demand for poplar for paper making which in many sections made it difficult to supply the demand from the immediate neighborhood, with the result that this wood, previously of little value, commanded a price nearly or quite equal to that for the most valuable kinds. The paper gave descriptions of the different species of poplar and their distribution. It is a notable commentary on the change which has taken place in paper manufacture since that time to observe that in the discussion on this paper spruce was not even mentioned.

In a communication from Mr. Edward Jack, of Fredericton, N.B., the following interesting statement was made in regard to New Brunswick:—

"For more than twenty years I have been engaged as land surveyor and timber explorer in New Brunswick, and have followed the white pine down to the mountains of North Carolina and East Tennessee and from my experience in the subject of woods can say that the neglect of forestry in New Brunswick and Nova Scotia, as well as in the Province of Quebec, is really lamentable. In New Brunswick we make no distinction between timber and farming lands, allowing and encouraging settlers to locate themselves upon spruce and hemlock land, the damaging result of which policy can be estimated by the loss of hundreds of thousands of dollars, while the unfortunate settler finds himself very often worse off at the end of ten years than he was at the date of settlement. A study of New Brunswick Forestry and a proper map accompanied by a written report would show intending settlers where to place themselves, as our spruce and pine lands, as well as the greater part of our hemlock lands, are unfit for settlement purposes, being poor and requiring much manure to render them productive. One-third of New Brunswick is in the millstone grit formation. This was once covered with spruce, pine and hemlock, being well adapted for the growth of these trees, and had we proper forestry regulations the growth of these woods on the dry and sandy plains of the millstone grit district might be made a constant source of profit and revenue to the Province. \* \* \* \* I think we should first find out from the explorations of competent and reliable

persons in what parts of the Province our valuable timber (hard as well as soft) is found, and after the matter has been well discussed, determine on what course of action to pursue. Until this be done it is of little use to attempt the formation of any scheme for forest preservation."

Dr. B. E. Fernow submitted a valuable paper on "Conditions of Forest Growth." In opening he pointed out the difference between agriculture and forestry—that the agriculturist had to bring about an artificial condition of the soil while the forester's aim was to preserve the natural condition. Inasmuch as the trees derive a large proportion of their material from the air, they do not depend to any great extent on the chemical character of the soil. The claim was therefore made that any soil in its natural condition contains sufficient organic material for any timber growth; that therefore the change of species observed on this continent can hardly be attributable to an exhaustion of the soil but rather to its physical condition, its depth and looseness and, depending on these, the capacity of absorbing and retaining moisture, which properties may be increased or even compensated for by a sufficient layer of humus. Attention was also called to the relative light requirements of trees, now so familiar a principle in forestry, as an important item in deciding the plans of management. In summarizing Dr. Fernow stated that the principal effort of the forester must be to preserve and increase the good condition of the soil since upon it depends the productivity of the forest. The measures to be adopted for this purpose are not so much to be sought in direct operations on the soil, but mainly in certain considerations in the selection of species, methods of management, terms of rotation, interlucation, methods of reproduction and in the general care of the forests. Of all methods of management the timber forest with natural reproduction from seed trees is best calculated to maintain the vigor of the soil for the shade enduring species, if the cutting is done with necessary prudence so that the soil is exposed as little as possible. Next to this method comes absolute clearing, with immediate artificial re-seeding or re-planting. This is almost the only method advisable for light foliaged trees. From this statement it will be observed that Dr. Fernow's views have changed in some respects.

Mr. Edward Haycock, President of the Ottawa Iron and Steel Manufacturing Company, Limited, spoke of the importance of the forests to the steel industry in a paper on "Canada's Forests and her future as a Steel Producer." Mr. Haycock stated that in the manufacture of steel for the future, wood charcoal was a necessity.

"Spain, Algeria and the Mediterranean islands with their rich ores have no wood. England is in a similar position, Nor-



way nearly so. Sweden, the present great steel producing region, is rapidly approaching the same position. Germany and France are in the same situation. The United States, with their vast consumption and rapid increase of charcoal blast furnaces, will hardly be able to keep up their supply many years. Russia's freights and internal dissensions kill the possibility of a supply being drawn from her. Where then can the coming "Steel Age" derive its supply from unless from Canada with her extensive woodlands and rich ore beds."

Alas for prophecies!

A paper on "Forest and Fruit Culture in Manitoba," by Mr. J. W. Taylor, United States Consul at Winnipeg, was transmitted by the Government of that Province to be read at the Convention. As to the causes of the present condition of the treeless areas in the West, Mr. Taylor quoted a statement made by Capt. Palliser in 1858 as follows:—

"Large tracts of country now prairie lands have at one time grown valuable forests and their present absence is the result of the repeated ravages of fires. Where a scattered and stunted growth of willows is found as a general rule was ancient forest land, which when dug to a sufficient depth still discloses numerous roots of destroyed timber. It is most lamentable to see so often such masses of valuable timber destroyed, almost invariably by wanton carelessness and mischief. The most trivial sign of one Indian to another has often lost hundreds of acres of forest trees, which might have brought wealth and comfort to the future settler, while it has brought starvation and misery to the Indian tribes themselves by spoiling their hunting grounds."

It was noticed in the Red River Settlement, although the primeval forest along the course of the river consisting largely of oak, elm and ash, had been long cleared away, as much for building the block or timber houses of the early settlers as for fuel, that yet there had been a succession of poplar and other trees of quick growth. Artificial aids to the reproduction of the forest were however adopted such as the Tree Culture Claim Act of the Dominion Government, under which 160 acres of land might be obtained by planting part with trees under certain conditions.

An interesting item in the history of forestry legislation mentioned was an act passed by the Legislature of Manitoba in 1882 by which the residue of the great highways and road allowances, after reserving one chain for road purposes, can be transferred to adjacent owners on the payment of one dollar per acre. The strips of land contiguous to the highways were thirty-three feet on each side in the case of the great highways and eighteen and a half feet in road allowances. Contracts with

the adjoining owners were to be executed by the Minister of Public Works, who was authorized in case of failure of the occupant to properly comply with the requirements of the law, to make such arrangements as will complete the work, charging the expense on the adjoining premises. The occupant was required to break the ground the first year, cultivate to crop during the second year, and plant in trees, seeds or cuttings during the third year. The trees were to be planted in straight lines and not more than twenty feet apart. The following kinds of trees, as being best adapted to the climate might be planted, namely: oak, ash, elm, ash-leaved maple, poplar, lalm of gilead, spruce, tamarac, balsam, pine, wild cherry and hawthorn.

Probably the most important result of the Congress was its deliverance on forest fires, as it undoubtedly gave the impulse and suggested the line of action which has been so beneficially adopted throughout Canada in the fire ranging system.

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The reports received at the Forestry Branch of the Department of the Interior of the results of the tree planting, which has been done in the West, make a most favorable showing. The number of trees set out under the direction of the Forestry Branch which are now alive and vigorous, will average ninety per cent., while trees in some of the groves planted out in 1902, are now by actual measurement from thirteen to fourteen feet in height.

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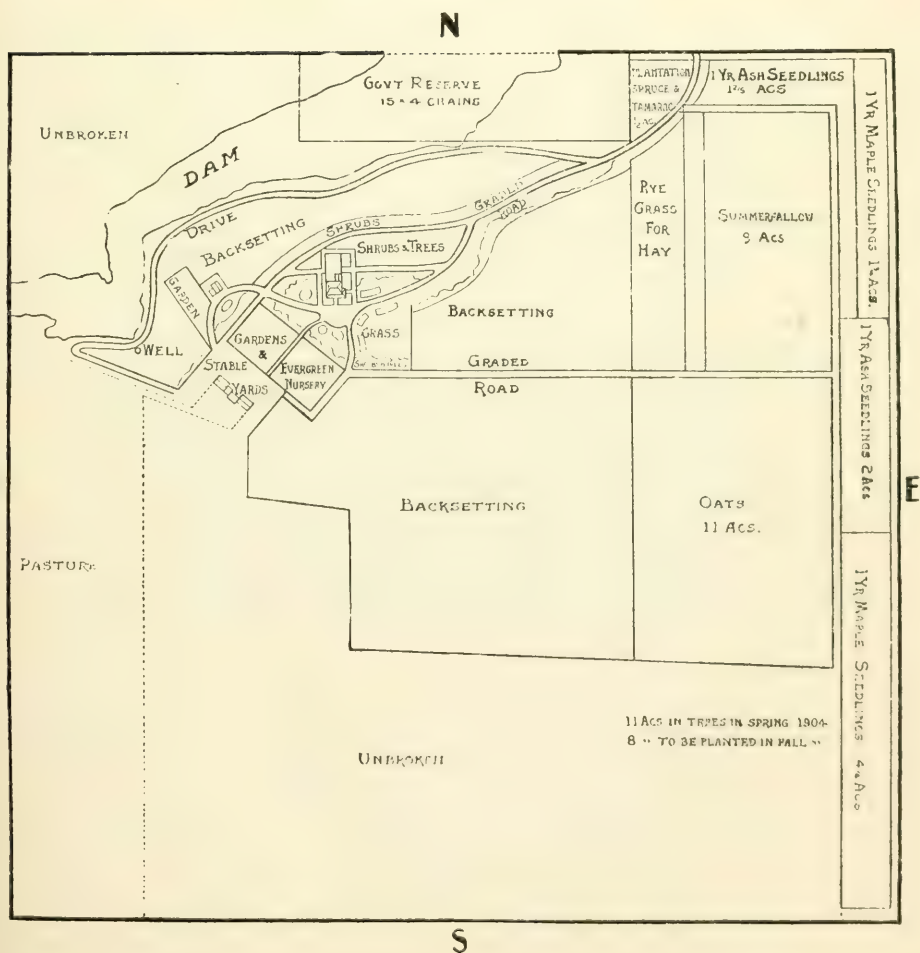
The Woods and Forests Department is just now engaged upon the considerable task of providing for the reafforestation of Windsor Great Park. His Majesty's first interest in silviculture was aroused when, as a young boy, he assisted his father, the late Prince Consort, to plant out the clumps of elms and oaks at Windsor and Osborne, which have since developed into sturdy plantations. The King has noted with interest the progress made by these early experiments of his, and has accordingly desired to associate his régime with a scientific plan for perpetuating the forest scenery of the Royal precincts. Thus the gaps left in the various avenues of the Great Park by the frosts and winds of recent years are being systematically filled up, a new avenue is created as an approach from the park to Frogmore, and clumps of young forest trees are being planted out upon bare spaces here and there, the intention being in some instances to preserve the symmetry of the plantings first made by the King's illustrious and far-seeing father.—*Timber Trades Journal.*

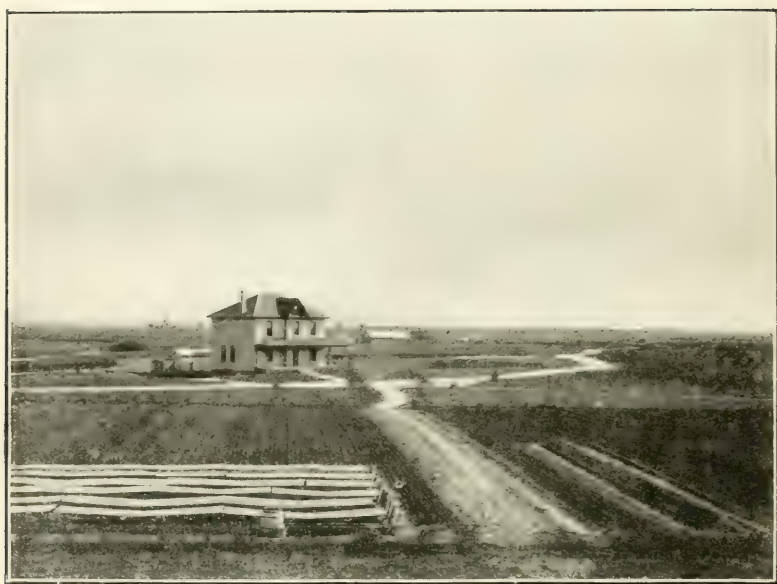
# NURSERY STATION

INDIAN HEAD, ASSA.

1904.

SCALE 9 CHAINS TO 1 INCH.





Nursery Station of Dominion Forestry Branch at Indian Head.



## TREE PLANTING IN THE WEST.

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*Norman M. Ross, Assistant Superintendent  
of Forestry for Canada.*

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Five years ago, in the spring of 1901, the Forestry Branch of the Department of the Interior commenced a system of practical co-operation with the settlers on the Western prairies with a view to assisting them in the formation of shelterbelts and woodlots on their farms. In order that the system might be successful it was decided as its main feature, to supply free of charge, seedling stock of hardy forest trees to those who were willing to comply with the regulations of the Department. Since the scheme was put into force the number of settlers desiring to take advantage of this offer has increased very rapidly year by year so that a very large number of seedlings are necessary to supply the increasing demand. This spring something in the neighborhood of two million seedlings were sent out and it is expected that from three to four millions will be required annually in the future.

To grow this number of seedlings of the varieties suited to the country requires a large area of ground. From the experience in the nurseries during the past three years it is found that on an average 80 to 90 thousand seedlings of ash or maple can be grown per acre. The ash are allowed to stay in the nursery two years and the maple only one. About 75% of the trees distributed consist of these two varieties. About 50 or 60 acres will have to be devoted to nursery stock each year to supply the three or four million seedlings which it is thought there will be a demand for. During the past three years a few acres on the Brandon and Indian Head Experimental Farms have been placed at the disposal of the Forestry Branch for nursery purposes. The amount of ground, however, available on these farms is now too limited for the increased work. It was therefore found necessary to select a site for a comparatively large nursery entirely independent of the Experimental Farms.

A quarter section of 160 acres situated a mile south of the town of Indian Head in the new Province of Saskatchewan on the main line of the Canadian Pacific Railway was decided upon as being the most suitable, owing to its proximity to the Experimental Farm where nursery operations were then being carried on. The land was virgin prairie but the soil is lighter than that in the immediate vicinity and

water is obtainable from a large dam on the property. This dam gives a practically unlimited supply, a very important feature in the west where good water is often hard to obtain in any abundance. The land is bare of trees so that there is no natural protection, however this is not much of a drawback as the hardy varieties can be raised successfully without protection while the more tender varieties can be grown on the few acres which have been used during the past seasons on the Experimental Farm and which are well protected. In another year or two sufficient shelter will be provided on the new nursery from the trees planted in the spring of 1904.

In the spring of 1903 a start was made by breaking and backsetting about 30 acres. In 1904, although the soil had not really had sufficient cultivation (as in the Western climate freshly broken sod takes a considerable time to rot), about 12 acres of this ground were planted to permanent shelter and a few sown with seeds of ash and maple to obtain seedlings for distribution. Eight acres were allowed to lie fallow to bring it to a better state for sowing in the fall; the remainder of the cultivated ground being sown to grass for hay and oats for feed for the horses. During the summer of 1904 suitable buildings for the horses, implements and men necessary for the working of the place were erected and an additional 40 acres broken up and prepared for cropping in the following year. The 160 acres was fenced and the main roads and walks graded up and gravelled. The accompanying sketch plan shows how far the work had advanced by the fall of this year. The strip running along the east and part of the north boundaries will be a permanent belt, a similar strip will be planted on the other boundaries as the soil is brought to a fit state of cultivation. The plots for growing the broad leaf seedlings are narrow strips an acre in size, running north and south and will be separated by hedges of caragana which will not be allowed to grow more than six or seven feet high. These hedges will afford ample protection and prevent the snow from drifting off the ground in the winter. About 25 acres will be needed annually for growing hay and oats and any ground not otherwise utilized will be planted to permanent plantations to illustrate the growth of the different varieties, the best mixtures and the best distances apart to plant the trees. From such plantations as these it is hoped to obtain reliable data as to the cost of planting and maintaining a wood lot and the probable revenue which may be derived from the various methods of planting and the different kinds used.

At present about ten acres are occupied by buildings, yards, drives and ornamental grounds. Along the edges of the main drive and round the lawns about 6,000 hardy shrubs were planted this spring (1905), and some two acres in front of the residence

seeded down to grass. It is desired to make this part of the grounds as attractive as possible in order to impress visitors with the beautifying effect of trees and shrubs when planted round otherwise unattractive buildings. The absence of anything of this nature is one of the most prominent features on the majority of prairie farms, in some cases from indifference but in most owing to the general impression that a great deal of skill and labor are necessary to produce a good effect, whereas only the most elementary principles of plant life have to be observed and the labor entailed is surprisingly small compared to the result obtained and the additional value of a property when the grounds are neatly and attractively laid out.

The varieties of trees principally grown for distribution are the native maple or box elder and the native green ash; besides these the native elm and white birch are grown from seed in smaller quantities, Russian poplars and willows from cuttings. A small number of conifers have been raised from seed each year, principally the native white spruce and Scotch pine. Other varieties such as Jack pine, *Pinus cembra*, *Pinus ponderosa*, *Pinus flexilis*, Colorado blue spruce (*Picea pungens*), balsam fir, Norway spruce and European larch are also being tried. The Colorado blue spruce, judging from specimens grown on the Experimental farm and individuals seen elsewhere, is a most promising tree for the North West.

The conifers are grown under a completely different method to that used for raising the broad leaf varieties. The seed of the latter is sown in such a manner that as much of the subsequent cultivation as possible may be done with horses. Drills are made, with a horse cultivator, 30 inches apart, and in these the seed is sown by hand, the drills being covered in again by a harrow toothed cultivator. The horse cultivator is used among the seedlings all summer and in the fall a tree digger is employed for the removal of the crop. Comparatively little hand work is employed as in this country land is comparatively cheap so that at present there is no advantage in growing the seedlings more thickly, horse labor is not so expensive as in some other countries and laborers' wages are very high. Conifer seeds are sown in very carefully prepared seed beds and the young plants protected by lath screens for two years. When two years old the seedlings are transplanted to rows, the rows are made about 10 inches apart and the plants set 3 to 4 inches apart in the row. Cultivation between the rows is done with the double wheel hand hoe. The seedlings remain in the transplanting rows two years and are then ready to set out in permanent plantation. The manual labor entailed in sowing, weeding and transplanting coniferous seedlings together with the length of time they must remain in the nursery, makes the raising of this class of stock

rather expensive as compared with the broad leaf varieties. The evergreen, however, is a tree especially suited to a country where the winters are so long and where thick windbreaks are such an advantage, so that the cultivation of this class of trees should be encouraged as much as possible. Nowhere in the west have conifers been extensively planted, but there is no doubt that several varieties will prove quite hardy and also profitable.

During the past five years something over 5,000,000 seedlings have been distributed from the nurseries of the Forestry Branch. In the future it is the intention to grow all the stock that may be required on the new nursery station at Indian Head which is now well equipped for the purpose and will in a very few years be well sheltered by the trees already planted for windbreaks. Any varieties hardy to the Northwest can then be grown from seed without fear of damage being done by the strong wind storms which at certain seasons of the year are extremely violent.

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In the report of the Boer Delegates, Messrs. Jooste, Lane and Rood, on the agriculture and stock farming of Canada, Australia and New Zealand, which has recently been published under the title of "Agriculture within the Empire," they have the following to say in regard to Forestry when summarizing their conclusions:—

"The planting of trees for shelter for stock and for future farm requirements should not by any means be overlooked. In fact this is a very important factor in successful farming. We recommend Cypresses, Pines and Wattles and any of the many varieties of Australian Eucalypts or Gum trees, all of which grow rapidly. Gum trees are especially desirable for fence posts, farm buildings, sheep and cattle pens, &c. It is a good plan to plant small groves of trees here and there about the farm, because a sheltering clump of trees will break the cold winds of winter and afford shade during the hot summer months, besides adding greatly to the beauty of the homestead. We noticed everywhere on our travels that progressive farmers always laid out small plantations, and the results were invariably found to fully repay the trifling initial cost and trouble. For garden hedges the Cypress pine will be found to answer as well as any, being very dense and hardy and standing both extremes of heat and cold."





Forest Nursery at Indian Head.



## WOODLAND TAXATION.

*Judson F. Clark, Ph.D., Provincial Forester for Ontario.*

### I.—ON LANDS IN PRIVATE OWNERSHIP.

The application of forestry methods to the management of woodlands, whether they be the large areas of the lumberman or the woodlot of the farmer, must find its justification in an affirmative answer to the eminently pertinent and practical question: Will it pay?

Among the many points to be considered in determining the answer to this query under any given circumstances, none, with the single exception of protection from fire, should receive more earnest consideration than the present and prospective taxation of the property. The fairest prospect for large returns from a policy of conservative lumbering may be nipped in the bud by a tax rate that makes it in the financial interest of the owner to strip the land of whatever is merchantable at the time, preparatory to abandoning it, much as he may regret having to do so. This, indeed, has been the history of the destruction of many millions of acres of the finest forest lands in North America.

Of prime importance in dealing with all classes of forest lands, the question of woodland taxation has recently acquired added interest in Ontario and other Canadian provinces in view of the necessity of planting on a large scale in the near future to offset the rapid destruction of the woodlots in the farming sections. It is natural that the woodlot owner should take more interest in the tax rate applied to his plantations than that applied to a woodlot already fully grown, for, come what may, years must elapse before he can realize on the crop on which he pays the tax. From the standpoint of the state, however, it is of quite as great public interest that the woodlands already in existence be conservatively managed as that the woodland area be extended by planting.

The principles governing the taxation of woodlands are of course the same, whatever the origin of the forest, once it has passed in fee simple to private ownership, and no distinction should be made in tax rates on this account.

Any discussion of the principles of woodland taxation must have regard to the three following considerations:

1. *The Assessment Basis:*—Whether or not the assessment valuation should apply to the value of the land or the value of the land plus the value of the timber standing on it at the time.

2. *The Rate Basis:*—There is a fundamental difference between levying an annual tax on properties producing an annual income and levying an annual tax on properties producing an income at intervals of a considerable number of years only.

3. *Woodland Tax Exemption:*—Whether there be any special economic reasons why lands bearing wood crops should be taxed at a different rate from lands producing other crops.

### *I.—The Assessment Basis.*

It has been the custom and the law of most states and provinces in North America to include the value of the standing timber with that of the soil in assessing woodlands for taxation purposes. This is both unjust and unwise, and is certain to result detrimentally to woodlands wherever practised.

Forest crops differ from field crops in that the product of any one year's growth cannot be harvested at the end of the growing season, as is the rule with other crops. Thus the portion of wood which is produced during, say, the fifth, tenth, or fifteenth year of a tree's or plantations' growth must remain on the ground until there has accumulated fifty, sixty, or seventy years' growth, when the whole may be sold to advantage. The growth produced during the earlier years of the tree's life is to all intents and purposes simply *stored* in the trunk of the tree until such time as the whole has reached a merchantable size. To add the value of a forty year's growth of pine trees to the value of the soil for taxation purposes is really as unfair in principle as to add the value of the last forty year's grain crops to the assessment valuation of a grain field. The forty years' growth of pine is not there for investment purposes. It is there simply because the nature of the crop requires the accumulation of decades of growth to make the whole merchantable.

It cannot be too clearly kept in mind in this connection that the soil and climate, and they alone, are the natural producing factors whether the crop be wood or wheat. To add the value of standing timber to the assessment is clearly a case of double taxation in that to the value of the producing agent—the soil—has been added the value of its product—the trees.

Unjust in principle, taxation of the growing trees is nothing short of disastrous in practice in that it provides an incentive to prematurely harvest the crop, the proceeds from which may then be invested where it will not be subject to taxation.

Fortunately in Ontario the law requiring that woodlands be assessed according to their sale value—including the timber—has not been generally enforced by the township assessors. The law, however, as it stands is vicious in principle and should



be amended. Timber-land owners in other states and provinces have not always fared so well. The State of Michigan furnishes a particularly instructive object lesson of the results of placing a heavy burden of taxation on standing timber. There on six million acres of non-agricultural lands, which thirty years ago carried one of the finest forests in the whole world, and which to-day are lying almost wholly waste, is to be seen the logical conclusion of the policy of assessing woodlands at a higher rate than that indicated by the capacity of the soil to produce wood crops.

The high taxation made but one kind of lumbering possible—to wit, the cutting clean of whatever was merchantable at the time as fast as it could be marketed, followed by the abandonment of the ruined tracts to the state for taxes. This policy was forced on the lumbermen landowners greatly to their regret and financial loss by the authorities who were responsible for the tax, but who failed to see that they were killing the goose that laid the golden egg. The net result was the transformation of a magnificent pine forest to a wilderness at a cost to the lumbermen of tens of millions of dollars, because of the forced haste in harvesting, but at far greater cost to the state as a whole in the total destruction of the forests on lands wholly unsuited for agriculture, to which must be added the loss of a lumbering industry which, had it been conducted on conservative principles, could have been a source of wealth to its citizens in perpetuity. Wisdom in this matter of taxation has not yet been fully learned, and the destruction of the remnants of Michigan's forests proceeds apace.

## *II.—The Rate Basis.*

In discussing the fundamental difference between the levying of an annual tax on properties capable of producing an annual income, and the levying of an annual tax on properties capable of producing an income at long intervals only, it is well to bear clearly in mind that this is purely a question of mathematics. It can, however, best be understood by studying a concrete case. To make this case as simple as possible the following conditions will be assumed:

1. That the properties to be compared be two plots of land of equal producing capacity, and at present without any crop whatever. By equal producing capacity is meant that each plot shall be capable of producing during the next sixty years a net annual yield at the time of harvest of, say, \$10 per year, whether devoted to the production of field crops or wood. If devoted to field crops the \$10 would be realized annually, but if devoted to wood production the annual growth of wood must remain in place till the end of the sixty years when the total will be worth \$600 net.

2. That one plot, call it No. 1, be devoted for 60 years to the production of farm crops, and that the other, No. 2, be planted to trees to be harvested at 60 years.

3. That money be worth 5% per annum compounded annually to the owner of the lands.

4. That it is desired to adjust the taxation of the two plots so as to bear equally heavily on the production of the farm crops and the wood crop.

The problem: If \$1.00 per year be the tax assessed on plot No. 1, devoted to the field crop, what should be the annual tax on the woodlot, plot No. 2?

The relative burden of tax rates on crops can best be discovered by finding in each case *the proportion the amount of the tax bears to the net value of the crop at the time of the harvesting of the crop*. This being so, tax rates on plots Nos. 1 and 2 must be so adjusted as to take an equal proportion of the net value of the crops on Nos. 1 and 2 at the time of harvesting. For example, a tax rate of \$1.00 payable yearly on plot No. 1 would be equally burdensome to the owner as a tax of \$60.00 payable at the end of every 60 years on plot No. 2. In each case the tax would amount to just 1-10 or 10% of the *net product* at the time of harvest.

Taxes, however, are usually paid annually whether the owner receives an annual or periodic return from his land. \$60 payable at the end of every 60 years being the equitable tax rate for plot No. 2, it remains to be found how much would be required to be deposited annually at 5% compound interest to amount to the \$60 at the end of 60 years. The equation is

$$\frac{\$60.00}{(1.05)^{60}-1} \times .05 = 17 \text{ cents.}$$

That is, a tax of 17 cents per year paid annually for 60 years on plot No. 2, money being worth 5% per annum, will at the end of the 60 years have amounted to \$60, or 1-10 the value of the then maturing crop.

Hence, the conclusion that if money be worth 5% per annum to the farmer, and that it requires 60 years to mature his woodlot plantation—two assumptions which can hardly be doubted—*an equitable tax rate based on the value of the soil for producing purposes should be in the case of woodlands but 17-100 or 17% of the rate paid on neighboring lands of similar quality used for the production of farm crops.*

The amount of the unfairness of a *similar* annual tax for both plots may be seen by comparing the accumulated value of the tax rate up to the time of harvesting the crops. For this purpose, let the annual tax on each plot be \$1.00.

The crops on plot No. 1, being annual crops and having a net annual value of \$10, it is clear that 10% of the net product goes to taxes. In the case of No. 2, which is planted to trees, 60 years must elapse before the harvest, and therefore 60 annual payments of \$1.00 each. The value of this at the end of 60 years is

$$\frac{1.00}{.05} \times (1.05)^{60} - 1 = \$353.58.$$

Inasmuch as the whole value of the crop is but \$600 at that time, it follows that 59% of the entire yield is consumed in taxes instead of but 10%, as should be the case to make the taxes an equal burden on the production of both classes of products.

The higher the interest rate used in the computation, and the longer the time taken to mature the forest crop, the more startling becomes the comparison.

The following table shows in percental values the proportionate taxation which woodlands, yielding periodic crops, can bear as compared with agricultural lands of similar net producing capacity. Column 1 gives rotations from 40 to 100 years; columns 2, 3, and 4 give the percentages according as money is valued at 4, 5, or 6%, per annum.

ROTATION	4%	5%	6%
40 years	42.1	33.1	24.9
50 "	32.8	23.9	16.5
60 "	25.2	17.0	10.7
70 "	19.2	11.9	6.8
80 "	14.5	8.3	4.3
90 "	10.9	5.7	2.7
100 "	8.1	3.9	1.6

Thus, for example, with a rotation of 70 years, and money worth 5%, the proper proportion for a woodland tax rate as compared with the tax rate for farm lands, would be 11.9 per cent, or in other terms, if the rate for the cleared lands be 15 mills, the rate for the woodlot should be 1.78 mills on a soil value assessment.

The finding, then, of the proportionate tax rate to be applied to woodlands as compared with neighboring farm lands is a purely mathematical consideration, depending wholly on (1) the value of money to the landowner, and (2) the number of years required to bring to maturity an ordinary crop of trees. What rotation and what rate per cent. should be adopted in this province in determining this proportion, admits of some discussion. *Five per cent.* is perhaps a fair return for investment of capital

in woodlands by farmers and lumbermen where there is no danger of loss by fire, and the average Ontario forest tree certainly requires full 60 years to reach maturity. On this basis the equitable rate for woodland taxation will be 17% of that for lands under farm crops, or in other terms, when the ordinary rate is 10 mills, the rate for woodlands should be 1.7 mills.

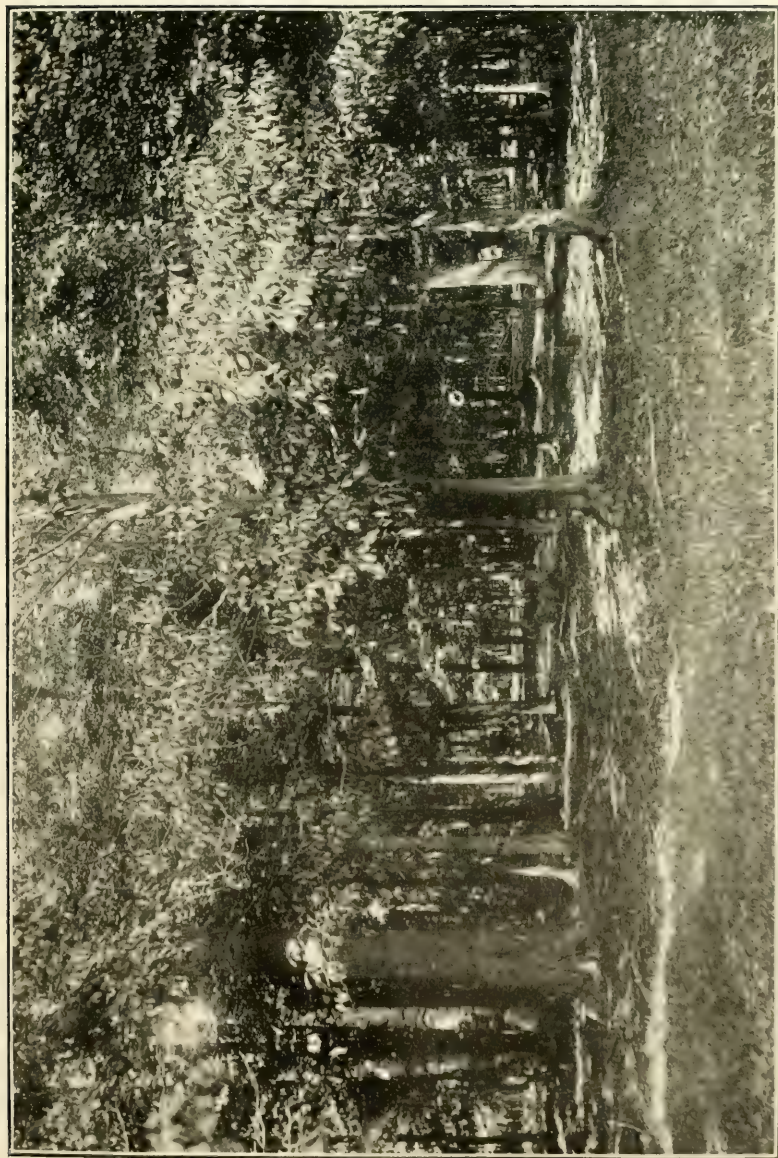
### III.—Woodland Tax Exemption.

There are several reasons which may be urged in favor of the remission of part or all the taxes on such woodlands as are maintained wholly for the production of timber, and which receive sufficient intelligent care to keep them up to a reasonable standard of production. They are

(1) The value of woodlands to the community in general by virtue of the beneficent influence exerted on the climate by moderating the force of heavy winds and by favorably influencing the humidity and temperature of the atmosphere; and by the very favorable influence exerted in regulating the flow of streams.

(2) The long time element in the maturing of a forest crop is a great discouragement in wood production. There is no line of business in which men ordinarily engage which requires the looking forward for more than a decade or at most two decades. Timber growing, however, requires the constant planning in advance for 60, 80, or even 100 years. So profound is the influence of this long time element that the great law of supply and demand is paralyzed. To illustrate: If the demand for wheat increases in relation to the available supply, the price rises, the farmers sow a larger acreage, and presently the increased demand has resulted in an increased supply. The same is true of hogs and horses, or of any other commodity which may be reproduced or even mined, except wood. The demand for wood has steadily and tremendously increased decade by decade for upwards of a century. The prices, notwithstanding the opening up of vast virgin forests which cost man nothing to produce, have steadily risen, and during the last decade, as exhaustion of supplies is seen in the distance, have very rapidly risen. This rise in price has not yet resulted in an increased production of wood, nor will it—judging from the history of nations—ever appreciably increase the production of wood until the evils of a wood famine have long been felt. On the contrary, although increased demand has meant increased prices, increased prices have only meant *increased harvesting*, and increased harvesting has meant and still means in North America that larger areas are annually cut over and cut more closely. This on account of the greater amount of debris left





A typical Ontario Wood Lot.



in the woods, leaves it in a much worse condition for the all but inevitable after-lumbering fire, which all too often leaves the land a waste, hence the net result of the greater demand for wood products in the case of lands held in private ownership is not an increased but a decreased production.

This tendency for an increased demand to result in the decimation of woodlands is not confined to North America, nor our own time, but has been the history of the forest wherever it is held in private ownership unrestrained by state control. There has, however, never been a better illustration of its workings than has been witnessed at our very doors throughout the farming sections of Ontario during the last ten and more particularly during the last five years. The value of standing timber has doubled within a few years with the result that the woodlots have been sacrificed at a hitherto unprecedented rate, and one that has alarmed every thoughtful observer. And yet not one farmer in a thousand, perhaps not one in ten thousand, has done any planting on a commercial scale. More serious still, not one farmer in ten has paid the slightest attention to caring for what woodlands remain. On the contrary, the all but universal practice of grazing the farm woodlands effectually prevents any recovery which nature might essay.

(3) A third plea may well be entered for the removal of all restraint on the production of a commodity which, while so peculiarly in a class by itself so far as regards the laws governing its production, is without exception the most useful raw material of all manufacture, and an indispensable agent in all production and transportation. Aside, indeed, from the character of its population, nothing contributes so much to the material progress and happiness of a nation as an abundant supply of timber at reasonable prices.

In view, then, of the value of woodlands to the community as a whole, the peculiar temptations to deforestation due to the long time element involved in the production of timber, and the indispensable character of wood in modern industrial life, the state may well exempt from taxation such private woodlands as are devoted exclusively to wood production, and which come up to a reasonable standard of production.

It stands to reason of course that such tax exemption should be made only in so far as seems necessary to prevent excessive deforestation in the agricultural sections, and to insure a future supply of wood for domestic use.

## II.—ON LANDS OWNED BY THE STATE.

The Canadian provinces, with the exception of Nova Scotia, have adopted the only safe policy of retaining in fee simple the ownership of the non-agricultural lands for the purposes of wood production.

That this object may be successfully accomplished, it is essential that the lands be kept under a crop of trees by either natural or artificial means. It is quite beyond the scope of this paper to discuss methods of reforestation, but a few general principles will be briefly mentioned, that the influence of taxes on the management and reproduction of the forest may be clearly seen.

The reforestation of non-agricultural lands on a large scale presents many practical difficulties which are not met with, or met with only in a modified form, in restoring woodlots and shelter belts in an agricultural district. The greatest bar to the replanting of denuded or burned areas of non-agricultural lands, is the danger of subsequent destruction of the plantation by fire. This is practically eliminated in farming sections where over-clearance has been practised. The planted woodlot has a further advantage over plantations on wild lands for commercial purposes, (1) in the amount of expenditure necessary in making the plantation, it being possible on farms to do the work at odd times in early spring at a minimum of cost; (2) in the practicability of greatly increasing the financial returns of the plantation by giving it greater care as it develops, such as the removal of inferior trees to favor the development of the better, thinnings, etc. Such attentions are of course wholly out of the question on wild lands where there is no market for the inferior materials which would be removed in these "improvement cuttings"; (3) in the nearness to market, enabling the farmer to dispose of the better grades at much better advantage—the cost of transportation being saved—and to utilize much material profitably which is ordinarily waste in the lumber woods; and (4) in the fact that the farm woodlands, if rightly placed, may have a very great value in favorably influencing the local climate and thereby increasing the profit of farming the neighboring cleared lands, and in enhancing the beauty and value of the farm property.

Commercial tree planting must for the present be very largely limited to agricultural districts. As soon as the fire problem is satisfactorily solved, it will undoubtedly be extended to large areas of wild lands which have been devastated by unwise lumbering and by fire to such an extent that seed trees of the valuable species are not present, thus precluding the hope of satisfactory natural recovery. Wherever the forest still remains, however, *a natural regeneration of the most valuable species by*



*a conservative lumbering of the present stand must in all cases be regarded as the basis of the forest policy.* Such natural regeneration is to be preferred as being vastly cheaper and in many if not most cases quite as efficient as artificial planting.

All methods of natural re-seeding of forests—and they are many to suit the many varying conditions found in the forest—agree in at least one thing, viz: that trees which, under a clean-cutting system, might be cut and removed at a profit must be left on the ground in greater or less number that they may maintain the production of the soil by growing to a larger size themselves, and by seeding up the spaces opened by the removal of their neighbors.

Any method of taxation, lease, or sale of woodlands which makes it in the interest of the operator who controls for the time the standing timber to cut clean or to cut the more valuable species only without regard to the future of the forest, is evidently prohibitive of any system of natural re-seeding.

The virgin stands of timber on the public lands of the different Canadian provinces are disposed of under some form of lease or license, which although differing widely in detail, are in all cases practically the same in principle. The timber is paid for under these leases as follows; (1) by a payment of certain "stumpage dues" of so much per M on the amount of material removed at the time of logging; (2) a ground tax or "rent" of so much per square mile per annum; and (3) where the limits have an estimated value over and above the "stumpage dues" and "ground rent," and are put up at public auction, a portion of the value of the timber is paid for in a third form, termed "bonus," which of course varies very greatly according to the location and character of the timber sold. In recent sales in this province the "bonus" has proved to be the largest portion of the market value of the stumpage sold.

Before discussing the influence of these financial conditions on the manner of cutting which the lumberman may adopt, it must be admitted that in justice to himself he must cut according as he will receive the greatest financial return for himself and his family. It may also be assumed that being a lumberman, and in most cases also a mill owner, he has a very real interest in the protection and development of the forest as a log producer in perpetuity. The fact that lumbering in Canada has in the past been almost uniformly destructive to our forests is due not to any lack of interest in the future of the forest on the part of the lumbermen, nor even chiefly to a lack of knowledge of how to care for the woods—though doubtless this has contributed—but primarily to a *lack of security from fire and from theft* (by "timber sharks," who in the guise of settlers steal his timber); and

*to the financial conditions imposed at the time of the sale, and the uncertainty as to what changes in this respect may be made in the future.*

The three ways in which the lumberman pays for his logs have each a special bearing on how it will be most profitable for him to cut the timber. The tendency of the stumpage dues, which are paid only when the logs are actually harvested, is towards conservative cutting. The higher the stumpage dues, the more careful will the lumberman be to select only the more mature timber, certainly no immature timber which has a stumpage value of less than the stumpage dues will be cut. The payment of a portion of the stumpage in the form of a cash-in-advance "bonus" has quite the opposite tendency. Assume, for illustration purposes, a pine stand cutting ten million feet of mature timber which has an average market value of ten dollars per M as it stands, or a total of \$100,000. If sold at public auction on a stumpage basis for \$10 per M the operator will cut no trees which when manufactured will not yield at least \$10 per M over and above the cost of manufacture. Suppose, however, that \$80,000 of the purchase price be paid cash in advance in form of "bonus" with the stipulation that the remaining \$2.00 per M be paid as stumpage dues when the timber is cut. The same operator who in the first case found it in his interest to cut no trees which were not worth \$10 per M on the stump will now find it in his interest to cut whatever may have a stumpage value of \$2.00 per M. The cutting of the young pines having a stumpage value of between two and ten dollars per M may under circumstances be the main difference between good forestry and destructive lumbering.

The annual payment of a "ground rent" per unit of area held by the lumbermen is worthy of special consideration. The payment of any annual tax on woodlands tends to early cutting and discourages holding for a second crop, hence affects the harvesting unfavorably from the standpoint of practical forestry. How great will be this unfavorable influence depends on the amount of the tax and the rate of interest demanded by the lumberman for the capital invested. Wherever there is a ground rent levied it becomes necessary for the lumberman when planning logging operations to consider carefully whether it will pay him to cut with care that he may return again after a period of years for a second crop—reasonable safety from fire being assured—or whether the tax will eat up the profit of any yield that he may hope for over and above what can now be realized by cutting clean without regard to the future. This is the only point of view from which the lumberman as a business man can regard the logging of the lands under his control, whether they be owned or leased.

The following table gives the annual "ground rent" payment per square mile for the different provinces and on Dominion lands, and the sums to which these annual payments amount for different periods of from 30 to 100 years. In this computation money is reckoned to be worth 6% compounded annually, which is below rather than above the mark for capital invested in immature forests on wild lands.

*Relation of Ground Rents to Conservative Lumbering.*

		30 yrs	40 yrs	50 yrs	60 yrs	80 yrs	100 yrs
Ontario and Quebec .....	\$ 3 00	251	492	923	1,686	5,611	18,418
Ontario (recent sales) & Dominion lands east of Yale, B.C.....	5 00	419	820	1,539	2,809	9,352	30,697
New Brunswick.....	8 00	670	1,312	2,462	4,495	14,964	49,114
Dominion lands west of Yale ....	32 00	2,682	5,250	9,848	17,979	59,856	196,458
British Columbia .....	96 00	8,045	15,749	29,544	53,938	179,568	589,373
	160 00	13,408	26,248	49,240	89,896	299,280	982,288

From this table a lumberman may see at a glance what his tax bill will be when he returns for a second logging on his lands. To make a second logging profitable he must find on his return a stumpage value, *over and above the then government stumpage dues*, sufficient to offset the two following items before he can reap any return other than interest for his invested money:

(1) The value of the trees which he refrained from cutting at the first logging together with compound interest on this value at, say, 6%.

(2) The tax bill, which at \$5.00 per annum will have amounted to \$ 419 at 30 years  
 1,539 at 50 years  
 9,352 at 80 years or  
 30,697 at 100 years.

Particular attention is directed to the manner in which the tax bill runs up the longer the time between loggings. This is the most significant feature of all taxation where the tax is annual and the return periodic as has already been fully discussed.

The whole influence of a ground rent is towards *early utilization and clean cutting with the abandonment of the land after the destruction of the forest*. The practical effect of this tendency in any given case will be in proportion to the amount of the tax. In Ontario and Quebec where the rate is \$3.00 per square mile over large areas, the injury is least; in British Columbia where the small mill owner must pay \$160 per square mile, it is greatest.

Where the tax does not exceed \$5.00 per square mile, and there is fair safety from fire and false settlement, its unfavorable influence should not be so great as to deter operators from conservative lumbering, especially on pine lands where stumpage values are comparatively rapidly rising, for where a goodly share of young trees remain on the ground a second logging may be undertaken in perhaps thirty or forty years. The conditions would be exceptionally favorable where an earlier return would be possible unless the lumberman be giving up the idea of continued crops and intends to cut to a smaller diameter at the second logging than at the first.

In view of the fact that first-rate white pine cannot be grown short of upwards of 80 years, it will be seen that in the matter of sowings and plantations the ground rent is a much more serious matter. That this is a very practical question is evidenced by inquiries from limit holders regarding the practicability and cost of reforesting pine lands by these methods. It is evident, however, that a ground rent of \$5.00 per year may be a very serious deterrent to artificial reforesting by sowing or planting or even to the use of any of the cheaper methods of natural seeding by the lumberman, for he must meet a tax bill averaging over a thousand dollars per year for the twenty years between the 80th and 100th year of the stand.

New Brunswick with an \$8.00 ground rent places a much greater financial obstacle in the way of progressive lumbermen who would care for the forest, but all Eastern and Central Canada is outclassed in this respect by recent legislation on the Pacific Coast where on federal lands the tax is \$32.00 and on provincial lands \$96.00 and \$160.00 per square mile.

The prohibition thus imposed on all hope of holding the lands for future crops may best be emphasized by repeating the amount of the tax bill as shown by the table. Assuming that the British Columbia lumberman has built a mill of sufficient capacity to enjoy the lower rate of \$96.00 per square mile per annum, he would find on his return for a second logging a tax bill as follows:—

At	30 years	....	\$8,045 00
"	50 "	....	29,544 00
"	80 "	....	179,568 00
"	100 "	....	589,373 00

Should he be so unfortunate as to be a small mill owner, the above amounts must be increased 40%.

Presumably this extraordinary piece of legislation, exacting a high ground rent and merely nominal stumpage dues (50c. per M), was intended to "develop" the lumber industry. Whatever the motive or intention, the result must be clear to every



student of forest taxation. The lumber industry of the West will under this policy be "developed" as was the lumber industry of Michigan. The finest of the forests will first be taken up and exploited in feverish haste. The lumbermen will be constantly struggling with a problem of "over production," which will cut profits down to the last notch. The forests will be cut without thought of holding them for a second crop, for it would, under such a policy of taxation, be impossible to hope for a satisfactory return. All trees which will now earn a dollar will be cut, and the fierce after-lumbering fires in the huge debris which accompanies western lumbering will complete the work of destruction. As in Michigan the lumber industry, after having been thus artificially "developed", will collapse, and if there still remain other forests to exploit elsewhere, British Columbia may yet do as Michigan is doing to-day—import at a cost of several times her former selling price a poorer substitute for the billions of feet of timber which a few years since were sold practically at cost of logging and milling, and her legislators will be inquiring how many millions of dollars will be required to reforest the denuded mountain sides. Unfortunately, the reforesting of much of this mountain land will be found impracticable, even impossible, for with the burning of the debris, the soil itself will in many cases also be destroyed.

No words can too strongly condemn the policy of the Pacific province. It is, however, simply an exaggerated form of the policy in vogue in older Canada, and in the reckless stripping of British Columbia mountain sides at the present time is a valuable object lesson to all Canada as to the character of the results to be anticipated from the collecting of a portion of the value of the logs sold in the form of a ground rent.

To remove all possible misapprehension from the minds of any who may think that the "bonus" or "ground rent" is other than part payment of the value of the logs sold by a province or the Dominion to the lumbermen, it is perhaps permissible to remark that lumbermen do not pay money out in the form of "bonuses" or "rents" for their health nor for any purpose other than for *logs*, and all their payments to the province, no matter under what form they may be made, are payments of a portion of the estimated value of the already grown or growing logs.

To sum up: the payment of a portion of the value of the stumpage in the form of a cash-in-advance "bonus" is not only disadvantageous to the legitimate lumberman—as distinguished from the limit owner who speculates in the people's forest asset—in that it locks up a large portion of his capital which should normally be used in the development of his business, but it is exceedingly disadvantageous to the forest, especially when a

time limit is set, as has been done in some recent sales, after which there can be no renewal of the annual license. Under these circumstances the lumberman as a business man has no choice except to cut clean whatever has a value above the stumpage dues preparatory to the abandoning of the ruined land. The payment of a portion of the price of the logs in the form of an annual "ground rent" tax is equally mischievous in tendency, and may even in Quebec and Ontario where it is quite low prove a very great bar to the reforestation of waste lands by private enterprise.

There is no form of sale so conducive to conservative lumbering of forest properties with a view to their development as producers of logs in perpetuity as the placing of the whole payment of the lumberman's price for the logs as stumpage dues of so much per M to be paid when the logs are cut. This is not only theoretically indisputable, but has in practical lumbering operations on both public and private lands been abundantly proven to be satisfactory to buyer and seller, and of the utmost advantage to the forest.

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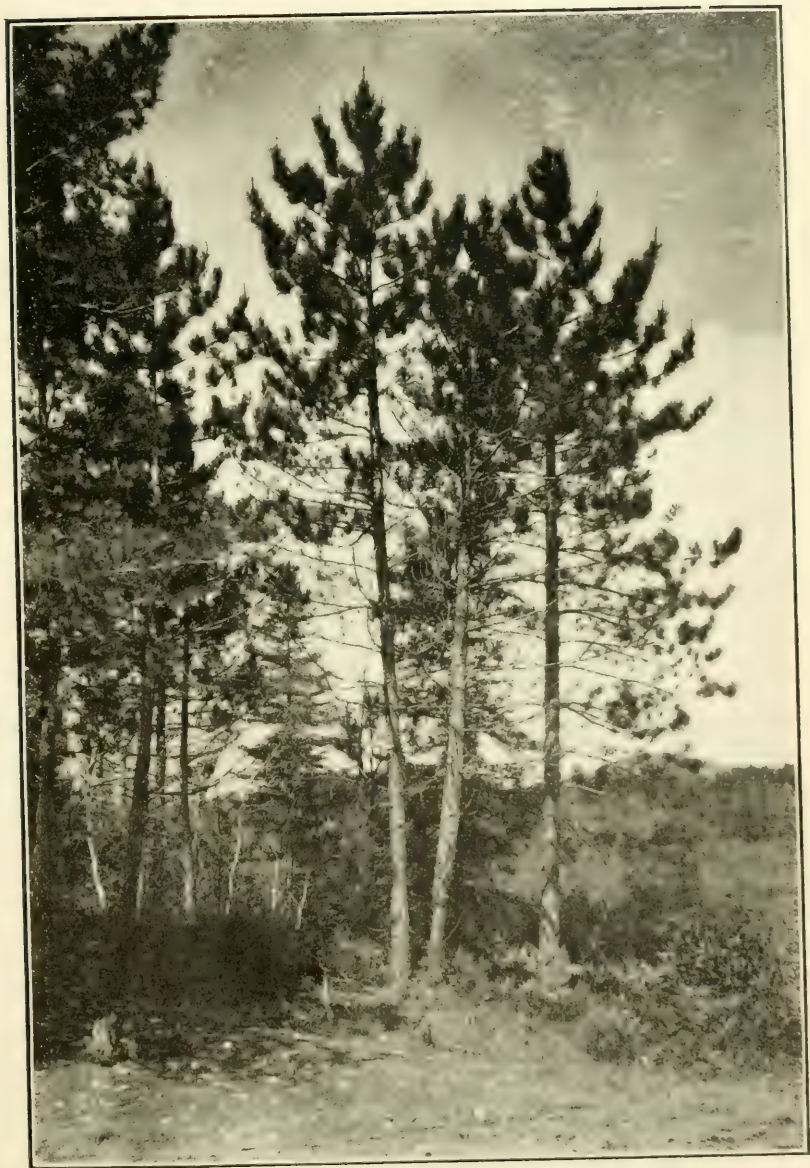
Mr. R. S. Cook, of Prince Albert, has on his grounds at that place a bur oak (*Quercus macrocarpa*) from Manitoba, which is now about sixteen feet in height and in perfect health. Mr. Cook expresses the opinion that this is the most northern oak on the continent.

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We publish two photographs illustrating the hardiness of Norway Pine, which have been received through the kindness of Mr. A. Knechtel, Forester to the New York Forest, Fish and Game Commission, and which were accompanied by the following note:—

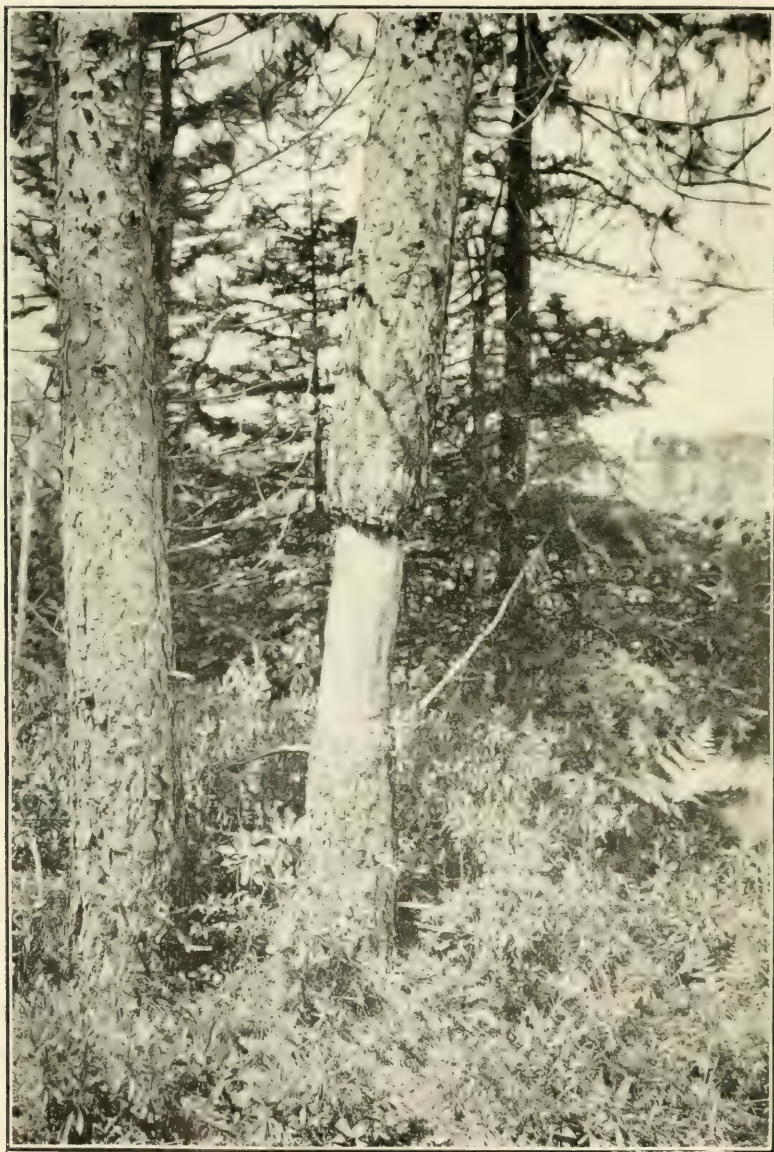
Close to the road leading from Paul Smith's to McColloms' in the Adirondacks, stands a Norway Pine tree which shows a remarkable hardiness. Nine years ago a strip of bark was removed from this tree leaving the trunk entirely bare all around the tree for a length of one foot. The tree is still alive and has during the nine years made a diameter growth of two inches. Its increase has, however, been only above the girdled part. The dimensions are as follows: height of the tree, 30 feet; diameter of the girdled part, 5.23 inches; diameter just above the girdle, 8.3 inches; just below the girdle, 6.4 inches.

The handicap in the struggle for existence is now, however, beginning to be apparent in the growth, as some of the branches have scanty foliage.



A Live Norway Pine Tree Girdled Nine Years Ago.—No. 1.





A Live Norway Pine Tree Girdled Nine Years Ago.—No. 2.



## WEST AFRICAN FORESTS AND FORESTRY.

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*A. Harold Unwin, D. Oec.,  
Forester, Benin City, West Africa.*

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In days gone by when Portugese and British adventurers sailed along the above named coast no one thought very much about the trees they saw, and less about starting any forestry operations there.

Since then times have changed and the Coast (as it is termed) now produces, besides its well known palm oil, quite an appreciable quantity of the world's mahogany supply.

In the above term is included not only six large British Colonies but also several French, German, Portugese and Belgian territories, besides finally the practically independent country of Liberia. The following remarks are, however, confined to the portion extending from Lagos, along the "Bight of Benin" to Calabar reaching back about 200 miles on both banks of the Niger to Idah, usually termed Southern Nigeria, a Protectorate of the British Empire.

Its products are largely palm oil and kernels, but also many others, including especially timber (mahogany, cedar, walnut) and rubber of several kinds.

The forests containing these latter export commodities are of vast extent, but present quite a different picture to either Canadian deciduous forests or the northern coniferous areas, where one so easily gets so many thousand logs of waney timber per mile, besides saw logs. Here one is content with about 400 per mile, and a maximum yield of perhaps 1,200 logs!!!

The tropical forest is in fact a vast arboricultural collection. On one square mile quite 50 or even 100 different species of trees (they have not been actually counted) might be found, besides shrubs, creepers, vines and small flowering plants and ferns. Such endless variety alters the forest problem considerably. In the aggregate there are many of each kind, especially of the commoner kinds such as mahogany.

All the land nominally belongs to the people, and is worked through their chiefs, and finally now by the white man with the consent of these latter. Anyone may put in an application for a large or small area (9 square miles up to 400 as recently granted), and lease it for usually seven years. It may, however,

be abandoned before the expiration of that period or renewed for a long time. The lessee gets the right under a deed to cut and take out certain timbers, usually mahogany, cedar and walnut, and any others he may find of value, except ebony.

Locating the merchantable allowable trees next occupies attention. Nothing under twelve feet circumference, if mahogany, may be felled.

The felling operation started, and usually with platforms as the mahogany have large buttress-like roots extending 10 to 15 feet up the stem, half a day to a day's work may bring a good 18 footer of 300 to 400 years' growth to the ground with two Bini axemen hard at it all the time.

The squaring then takes place so that only the best material with scarcely any waney edge on it is left.

Rollers are then laid down from the trees or group of trees gradually extending to the nearest stream, when 70 to 80 natives get a long rope and pull log after log to the water.

Tedious as it may seem, the ground is too soft for trolley and often on the small areas there is not enough timber to make it worth while to put down a light railway, although wages are not so low as to make manual hauling a very cheap operation (labour 9d. a day including food).

The bush labour is usually reckoned at 3 cents a foot B.M., though of course it varies. This is on an average of a mile from the waterside and with good trees. Add another 3 cents a foot for the rafting, freighting and selling expenses, and roughly the total cost is covered.

Prices in England have varied enormously, from \$2.50 per foot to 2 cents, and sometimes no bids at all, though last year the average was 7.5 cents per foot all round from this part and a little higher from farther up the coast.

The rafts as they float down the placid rivers, shaded on either side by oil palms, mangroves or wine palms, look very picturesque, especially with little native huts in the centre.

The supervisor on the limit then feels his labour has not been in vain, even with his months of lonely living in his bush bungalow, with a canoe or a mail runner as his only connection with his fellow white men. Occasionally he will be visited by the Government forest officers, otherwise only by his firm's superintending representative.

Black clerks do the lining and only the marking and numbering of both stump and log is undertaken by the European. Another part of the latter's work is, however, the planting of seed and raising of seedlings to be planted to replace those cut down (under the old rules, 20 seedlings for each tree felled). A group



Hauling Timber in West Africa.



The Sturgeon Lake Lumber Co.'s Yard, North of Prince Albert. (See p. 175.)  
*Photo by W. J. James, Prince Albert*



of young trees is made near and around the stump of the old tree and seedlings are also put in along the hauling roads. In this way a future growth is assured. In three years one of the plants has attained a height of 20 feet, and the average is even 15 feet.

Besides this the girth limit insures fresh supplies though the forest is a little abnormal in respect of small trees, but this may only be local, as by no means every portion has been visited.

It will thus be seen that a permanent supply of timber is aimed at and is no doubt secured. But it may be asked at what cost. Roughly, 50 small and 12 large areas have been and are being worked by several different firms paying royalty and export duty, in the aggregate about \$15 per tree (not at all heavy with such valuable wood).

Recently, during 1904 and 1903, more than enough was raised in this way to pay for the Forestry Department (vote, 1904-1905, \$50,000), which is all the more satisfactory as all the royalty goes to the native chiefs and not into the treasury, which reduces the total raised by quite a fifth.

In a further paper it may be of interest to follow the whole organization in detail.

Through the kindness of Mr. R. S. Cook, of Prince Albert, we are enabled to show in this issue two pictures of forest scenes in the district north of the Saskatchewan River. It will be somewhat of a surprise to those who have considered the western provinces as all prairie land to see the size of the timber that is being cut. The most important forest growth in that district is spruce, but some large aspen poplar may be observed among the standing timber in the photograph. Jack pine is also found on the lighter soil of this district.

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A fact of special interest is the discovery by Mr. Wm. McInnes, of the Geological Survey staff, of a new species of birch in the district north of Lake Superior. Specimens of a black birch noted in the previous year were brought home and handed to Professor John Macoun, who submitted them to Dr. C. S. Sargent for determination. Dr. Sargent named this birch *Betula fontinalis*, Sargent, a species formerly confounded with *B. occidentalis*, Nutt. The range of this tree in the sub-arctic region is not yet known. Specimens of this birch were found last year as far north as latitude 53° 35' north.

## THE BALSAM POPLAR.

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The Balsam Poplar (*Populus balsamifera*, Linn.), is found growing commonly throughout the Northern United States and Canada, but it reaches its greatest development in the north, especially along the Mackenzie River and its tributaries, where it often reaches a height of one hundred feet and more, with a diameter of six or seven feet. Professor Macoun states that this tree in habit differs very much from the aspen, but in its range it extends even farther north, and instead of being of little value, as the aspen is, it attains a great size and height as far north as the Arctic Circle on the Mackenzie River. West of Manitoba and northward it is usually found growing on alluvium in the river valleys, and in such situations it is often nearly 150 feet high and frequently over 7 feet in diameter. On the Peace River and all streams which unite to form the Mackenzie, it occupies all the islands and low alluvial banks. During the period of flood many trees fall into the rivers by the wearing away of the banks, and a great number of them in the course of time reach the Arctic Ocean. These are eventually cast on the islands and shores and become the chief source from which is derived the fuel supply of arctic travellers. The same may be said of the Yukon Valley, as it is this tree that occupies the valley and islands of that river on all newly formed lands, but in time gives place to spruce as the subsoil becomes cold and moist from the density of the poplar and willow growth. The Riviere aux Liards or Liard River (often erroneously called Laird River), a tributary of the Mackenzie, is named from this tree.

The leaves differ from those of the poplars previously mentioned, by being narrower in proportion to their length. They are ovate-lanceolate, acute or acuminate, dark green and lustrous on the upper surface, pale and often ferruginous on the lower. The usually broadened base is rounded or cordate. The color of the bark is chestnut brown. The aments or catkins appear in early spring, before the leaves, and the seeds are distributed about the end of May or early in June, covering the ground with their snow-white cottony envelope. The wood is light, soft and close-grained, but is not strong. The heart wood is light brown and the sapwood white. Its specific gravity is 0.3635, a cubic foot weighing 22.65 lbs. The leaf buds are saturated with a yellow, balsamic, sticky exudation, which gives the tree its specific name.

*P. balsamifera*, variety *candicans*, cultivated as a shade tree, differs from the common form in its more spreading branches, forming a broader and more open head, in its broader, heart shaped leaves, which are more closely serrate with gland-tipped teeth, more or less pubescent or hairy when young and at maturity paler on the lower surface. It seems to be still uncertain as to whether this is entirely an introduced variety or is indigenous.

The name Balm of Gilead often applied to this species is derived from the healing virtues ascribed to the balsam of its leaf buds. It was often planted for this express purpose, and was held in high esteem by the amateur physicians of older days. Various preparations of it were recommended by the recipe books, which had such vogue before the day of the doctor and patent medicines. One which lies before us at the present time gives a Balm of Gilead salve prepared with tallow, balm of gilead buds and other ingredients, which is stated to have been in use in this country about forty years with the greatest success.

Two other trees which have also borne the name *P. balsamifera* are western species, which are now generally known as *P. angustifolia*, James, the narrow-leaved poplar or black cottonwood, and *P. trichocarpa*, Hooker, also called black cottonwood or balsam cottonwood. The former is distinguished by its long narrow leaves, lanceolate or ovate-lanceolate and green on both sides. It is a small tree, not usually more than fifty or sixty feet in height, and rarely exceeding eighteen inches in diameter. The slender erect branches form a narrow and usually pyramidal head. The bark is light yellow green. The wood is light, soft and weak. Its range is from New Mexico to Southern Alberta, in which latter it is found along the Milk and Belly Rivers and their tributaries, and also along the Bow River.

*P. trichocarpa* is the most westerly species, being found on the Pacific coast from Alaska to California. In British Columbia it occurs in the valleys of the Columbia and Fraser Rivers. It is stated by Dr. Dawson, that this tree was used by the Indians of British Columbia for the manufacture of canoes, and the roots were formerly used by the Indians of Oregon and Northern California for making hats and baskets. The leaves are usually broadly ovate, acuminate, rounded or cordate at the broad base, dark green on the upper surface, pale, ferruginous or silvery on the lower, while the seed pods are tomentose or woolly. This tree reaches 200 feet in height, with a diameter of seven or eight feet. The specific gravity of the wood is 0.3814, a cubic foot weighing 23.77 lbs.

## FORESTRY IN ONTARIO.

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The report of the Director of Forestry for Ontario for 1903, which was delayed on account of the fire having destroyed the printing office in which it was being set up, has recently been published. It contains a resumé of the situation in regard to the tenure of the timber lands of the Province.

The chief way in which timber lands are held by lumbermen in Ontario is by annual license, renewable from year to year. The lumbermen are allowed to remove the timber, paying dues therefor when cut. In the agricultural districts the lumberman has been the precursor of the settler, affording him employment in the winter and a market for the produce raised on his holding in the summer. As settlement advanced the land was turned over to the individual settlers in small holdings. As settlement progressed north, a portion of the country was reached, the lands in which were found to be little suited to farming, although a great many settlers, misled by the high prices received for produce during lumbering operations, were allowed to settle on these lands, finding when too late that the time had been wasted, and that the land was ill-suited for their purposes. Other areas under license were composed of land that was clearly unfit for farming, and on such territory the licenses have been renewed from year to year.

Although it is probable that the Crown possessed and still possesses the legal right to refuse to renew these licenses at any time, certainly at a period when it might reasonably be supposed that the original timber taken into account when the limit was first put under license had been cut off, yet the practice of renewing the license yearly, which had been in vogue for so many years, led to frequent transfers of these limits from one holder to another, and the cancellation or failure to renew the license would mean that the last purchaser of this limit would naturally be out of pocket on his investment. Hence the difficulty of cancelling these licenses except at a stated time, a long period in the future.

In 1896 a Forest Commission was appointed and in its report recommended the establishment of Forest Reserves, and in accordance with this recommendation, the Forest Reserves Act was passed, which authorizes the Lieutenant-Governor in Council to set aside from time to time such areas of land as are unsuited for agricultural settlement, to be kept perpetually in Forest Reserves. Under this Act there have been set apart



areas aggregating seven million acres, including both forested and burnt over lands.

In regard to the term of tenure of lands under license a change was made in 1901, when the renewal of licenses was restricted to a period of ten years. It was found however that the necessity on the part of the lumbermen, who had paid a large sum in advance on this timber, of taking his timber off in so short a time caused rather reckless cutting, and the term in the sale held in 1903, was extended to fifteen years. While in the case of agricultural lands destined to be ultimately settled, and from which the pine timber is required to be sold for public revenue, this plan is probably as good as could be devised, it can readily be understood that the practice that will inevitably be followed by the license holder of taking all the timber off this territory that is big enough to cut at the end of the fifteen year period, will not conduce to the largest revenue to the Crown that could be derived.

The timber lands in Ontario therefore include permanent Forest Reserves, lands under license for an indefinite period, and lands under license for fixed terms.

The reserves so far created lie at the head waters of streams, and the larger forest area will doubtless include the Laurentian country, separating the clay lands of the north from the settled areas of the south, forming the watershed of the rivers flowing north and south, and will probably eventually include forty or fifty millions of acres. What this immense territory kept permanently under forest and operated in a scientific manner will mean in the future of the Province it is hard to estimate. The effect of this large forest on the water supply will be of incomparable benefit to future generations, and the revenue from it under any proper system of management, will be such that the people of Ontario need have no fear of direct taxation until the public expenditures of the Province are enormously in excess of the amount now annually expended.

In this report Mr. C. W. Nash deals in a suggestive way with the question of municipal forest reserves. In the report of 1900-01, an exhaustive statement, compiled from the returns of township assessors, was given from which it appeared that the proportion of woodland to total area in 36 counties was less than twenty per cent. While in many counties the lands are almost all suited for agricultural purposes and the wood lot will be about the only form of forest growth, there are large districts in the Province in which a large proportion of the lands are strictly non-agricultural, but where the title to the lands has all but entirely passed from the Crown to private hands. In these districts there are large contiguous areas which are either entirely unfit for the production of any other crop than wood,

or are, at least, much better adapted to being used for wood crops than for other crops. Their present condition is that they are lying almost wholly unproductive and their owners have neither the knowledge of how to again restore them to production by afforestation, nor the capital with which to do it. Nor would they have the power to protect the growing crop were both the skill and capital available to make the start.

The districts of Muskoka, Haliburton and others furnish striking examples of the results of throwing open for settlement territory largely unadapted for agriculture. The settlers upon many of the lots being unable to live solely by cultivating their land have in many cases, when the timber has been removed, abandoned their farms. Much of this land, if managed upon forestry principles, would continue a permanent source of wealth; but under the present system it is simply despoiled of its growth and partly farmed under very disadvantageous conditions, and partly allowed to remain waste, the second growth not being protected. A large proportion of the lots after being denuded of saleable timber are of so little value that the owners allow them to be sold for municipal taxes, and are frequently bought in by the municipalities. Were the townships permitted to retain the ownership of the lots which thus fall into their hands, the nucleus might in this way be established of a system of municipal forest reserves, which would not only supply the public requirements for timber for bridges, culverts, piles and other construction works, but would in time become a considerable source of revenue. As the law stands, however, municipalities can only buy lots offered at tax sales on the condition that they are re-sold within seven years, so that the only result is that the old chaotic and wasteful process of exploitation is again put into operation.

A suggestion is made that in the opening up of new districts, before any new township is thrown open for settlement, the surveyors be instructed to report as to rough and non-agricultural land embraced within its boundaries, with a view to withdrawing such areas from settlement and retaining them as timber reserves.

The question of municipal reserves is certainly one well worthy of consideration. In Germany the communal forests make many of the towns which are fortunate enough to own them, independent of taxation altogether. When money is required for any purpose the town forest is ready to supply the need, and in some cases instead of taxation there is a bonus for the citizens.

Mr. Nash also contributes a paper on the farm wood lot, so that the whole question of forestry in Ontario is fully covered in the report. One of the greatest conveniences a farmer can

have upon his property is a wood lot, well stocked with a variety of thrifty well grown trees, upon which he can draw, as occasion requires, for such wood material as he needs for his own use, with some to spare at times for the market. The uses to which farm grown timber can be put are almost incalculable and the demand is continuous. The wood lot should occupy the poorer parts of the farm, rocky or stony land, the thin-soiled ridges, very dry sand tracts and such wet swampy places as are not well fitted for agricultural purposes.

Various systems of managing a wood lot may be adopted, both to ensure permanence and profit. Where only firewood, fencing, hop poles, box lumber or such small stuff is required, and the wood lot is composed of deciduous trees only, the copse or coppice method, viz., growing from sprouts, will do very well, but if dimension timber is desired, or a growth of pine, spruce, hemlock or other coniferous trees is the object to be attained, the coppice system is not available; in such cases natural seeding or replanting are the only sources to be relied on to keep up the supply. Planting is always troublesome and more or less expensive, but may under certain circumstances, become absolutely necessary. Natural seeding costs nothing, is no trouble and is the most certain and in every way the most satisfactory method of keeping the wood lot up to its best standard of production. A proper proportion of seed bearing trees should therefore be retained in such positions over the whole lot as to ensure their furnishing sufficient seed to replant each portion of the wood lot as the timber is taken off it. This does not mean the maintenance of a lot of old trees upon the land until they shall have lost their usefulness as timber, but merely until such time as the cleared area surrounding them produces a strong growth of saplings from the seed which they have dropped. Provision for this can best be made by doing the annual cutting on a regular system under which the young growth outside the area to be cut over will be safe from injury, and the cleared portion will be at once seeded by the seed-bearing trees left for that purpose. In some parts of the country there are still wood lots in the possession of farmers, which have been regularly and systematically cut over for thirty or forty years, but which show no signs of deterioration, simply because the work has always been properly done with a view to reproduction of the trees, and care has been exercised at all times to avoid the destruction of the saplings.

Included with the report are the series of lectures on Forestry, delivered by Dr. B. E. Fernow at Queen's University in January, 1903.



## RECLAIMING SAND DUNES.

In the report for 1904 of Dr. Jas. Fletcher, Dominion Entomologist, occurs the following interesting report in regard to efforts made to reclaim sand dunes in the Province of Quebec:—

A visit was paid to the large tract of shifting sand near Lachute, Que., locally known as the Argenteuil Sand Hill. This is estimated as now covering nearly one thousand acres, stretching along the Ottawa River in an elongated patch about four miles long by half a mile to one mile in width, for the most part entirely destitute of vegetation, but bearing in places clumps of spruce trees, maples, tamaracks and willows. As is usually the case on such areas, the surface is very dry; but a few inches below this there is an abundance of moisture available for the support of any plants which can be protected against the drifting sand.

At the request of Mr. Thomas Christie, M. P., I called upon the various farmers living around this sand hill and examined the work they had been doing in their efforts to control the sand. I found, without exception, that every one of them had taken a keen interest in fighting against the common enemy, and much good work had been done in the way of holding back the drift by planting trees and other vegetation. Since 1898 the attention of the Division has been directed to this tract of land, and a few hundreds of plants of the Beach Grass, and also of Norway and White Spruce trees, have been sent to different farmers to be planted on the sand as an experiment; but no extensive work has been carried on by the department. I was much pleased to see the success which had attended the efforts to grow trees on this apparently barren sand hill. The kinds of trees which were noticed growing wild in the scattered clumps which here and there appear, were White Pine, Tamarack, Canada Balsam, White Spruce, White Cedar, Balm of Gilead, Aspen Poplar and White Birch; and round the edges all the ordinary forest trees of the region are represented. In low spots two or three kinds of willows and the Gray Alder flourish.

Of shrubs which attracted attention by their vigour and the extent to which they had spread out in every direction, special mention may be made of the following kinds which doubtless can be made use of in prosecuting this work. The Willow-leaved Meadowsweet (*Spiræa salicifolia*, L.).—This free-growing bush, which not only produces large numbers of running roots or stolons, but also ripens much seed, was found to be cov-



ering many acres and spreading rapidly over some low spots in the central portion of the sand hill. This is a native shrub, common in all swamps and low lands. The Red Raspberry (*Rubus strigosus*, Mx.).—A form of this common shrub was seen covering a large area on the farm of Mr. Thomas McGregor, who has encouraged its growth, as well as some other native plants which occur with it. The common Blackberry (*Rubus villosus*, Ait.).—Even more luxuriant than the Red Raspberry was the Common High Blackberry, which rooted freely through the sand and threw up many stems. Both of these berry-bearing plants produce heavy crops of excellent fruit, and it seems as though they might prove a valuable resource to farmers, while at the same time performing the important office of providing a barrier against the encroachments of the sand or as a temporary shelter, while more valuable trees are being grown. Roses.—At various places old and vigorous clumps of Sweetbriar, which were evidently many years old, were seen, as well as of the little old-fashioned semi-double Cinnamon Rose. The Smooth Meadow Rose (*Rosa blanda*, Ait.) was found in spots, covering several yards in diameter and showing an unexpected power to grow up and keep its head above the drifting sand. Shrubs which also showed great vigour and which occurred in many parts of the sand hill, where evidently they had sprung up spontaneously, were the Red Osier Dogwood (*Cornus stolonifera*, Mx.) and the Beaked Hazel (*Corylus rostrata*, Ait.).

Of the wild herbaceous perennials growing naturally on the sand, and the growth of which had to some extent been encouraged, the most noticeable were the Common Milkweed (*Asclepias cornuti*, Decne.), the Canada Thistle (*Cnicus arvensis*, Scop.), and Couch or Quack grass (*Agropyrum repens*, L.). There were also seen in some places a few plants of the Strawy Sedge (*Carex straminea*, Schk.), the Ox-eye Daisy and the Dandelion.

The trees which have been experimented with to the largest extent by farmers living in the locality are the White Pine, Canada Balsam Fir, the Norway Spruce, the White Spruce and the Tamarack or American Larch. Of these, the last-named has made the most rapid growth, but seems to require more protection than the sturdy spruces. The Balsam Fir has succeeded as well as the spruces, but is a less valuable tree. The Norway Spruce has been planted only to a small extent, a few hundred trees having been sent from this department three years ago. These were planted carefully, and doubtless will succeed; but it is too early as yet to compare them for this purpose with the White Spruce, which is the favorite conifer and is transplanted from the woods in the neighborhood. The greatest satisfaction is expressed by all at the way in which willows have succeeded. The kind used for the most part is the large European Tree-

Willow (*Salix alba*, L.) known mostly in this country under the name of French Willow. Large numbers of these trees have been started from cuttings and have in a single year made a remarkable growth, even from small cuttings put in with little labour in a furrow made by a plough. Such plantations were seen on the farms of Mr. John Doig and Mr. Walter Smith. On the edge of one of Mr. Doig's plantations the sand had been drifted away by the wind so as to expose the roots of one of his trees. These, by actual measurement, extended for forty feet from the central point, showing the great value of the willow as a sand binder, both from its rapid growth and from its great root production.

An observation of much interest, as showing the power of the Canada Balsam to resist destruction by sand, was that this tree, when covered up to a certain extent with sand, threw out large numbers of roots from the branches which were partially submerged. Many samples of such branches were found upon trees which had their roots and trunks covered up with from six to ten feet of sand.

Experiments with Beach Grass and the Sea Lyme Grass have been very satisfactory, particularly where the former has been planted on exposed banks. In low, undisturbed spots the Sea Lyme Grass has succeeded rather better than the Beach Grass. Tufts of both of these grasses were found in some places to have extended four feet in each direction by the end of the second year, and on Mr. Walter Smith's land one clump was found which had a thick growth four feet across in the centre, with five smaller shoots around it and eighteen shoots just showing through the sand, which will produce tufts of leaves next spring at a radius of twelve feet from the centre.

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The Canadian Forestry Association owes a great deal to the active work done on its behalf by Mr. William Little, of Westmount and a still further evidence of this is shown in the fact that he has recently induced the Bank of Montreal to make the managers of its offices, numbering some eighty-seven, members of the Association. The thanks of the Association are due to Mr. Little and also to the management of the bank for their public-spirited action.





Trout Lake, Northern Ontario



Vicinity of Trout Lake after the Fire.



## FOREST FIRES IN NORTHERN ONTARIO.

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IN "CANADA FIRST" FOR AUGUST.

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It was about three o'clock in the afternoon, and I was some two miles back in the bush, when a man came down the trail at breakneck speed, "Get out quick," he yelled, and then for the first time that day I smelled smoke. I admit I ran, and it was well I did so, for a roaring, crackling, veritable hell of flame was at my heels in as few moments as it takes me to pen these words.

After as short a time as ever that trail was travelled on, I struck one of the mines, and there all was commotion. Every available pail and receptacle which was water-tight had been pressed into service, and all hands were at work, some felling trees, tops outwards, some going out to meet the fire, cutting down all the birch to keep the inflammable bark from flying and carrying the fire onward, while others patrolled the road, water pail in hand. We met and fought the fire by fire, and for a few moments saved the camps.

Night fell on a scene which beggared description. The whole country seemed on fire. The atmosphere was filled with smoke and ashes, some of the latter burning us as they fell. Our eyes ached, our breath came in gasps from our charcoal charged lungs, and sleep, or even rest, we dare not. The heavens were brilliant with the reflection of the lurid flames, while the forest,—or what was left of it,—was a scorching mass of fire. Devouring tongues of the flame licked the cedars and balsams clean and clear of all foliage, leaving them like ghastly skeletons, and then sprang twenty feet above the highest forest tree, as if to seek others upon which to wreak their wicked vengeance. From tree top to tree top sprang these pillars of flame, until our fire met the main body, and then with a fearful roar, amid which the crash of falling trees could be heard, the fiend swung off to the south, and for the time being we were safe.

But what of the others in the track of the fire? It was the following day before we heard all the news, as blistered and worn out we walked over the still smoking ashes to see how our neighbors had fared. Not a vestige of green caught our eyes; ashes, ashes, that was all, save for the dead skeletons of forest giants—not a bird could be heard, even the rabbits and chipmunks had fled, or had perished. The forest, of a truth, was dead.

Beyond a few isolated tents, we found that all was safe. Fortunately a warning had been sounded in time, and where camps were not on well cleared ground, the flames had been fought with success. In more than one instance, prospectors had to take to their canoes, after dumping their tents and outfits in whichever of the lakes they were camped on, for there was no time to pack, the fire travelled too fast.

One amusing incident occurred. Two fire-rangers, whose names need not be mentioned, left us early in the morning after the fire to return to their own camp. After travelling about a mile on the trail they were met at a turn by a bear, who promptly disputed the right of way with them. Bruin sat down on his haunches, and evidently studied the situation as well as his smoke-filled eyes and brain would let him, and the result of his calculations caused him to stick to his position. There was no way round, and as the rangers were armed only with their axes, they decided to leave him the undisputed possession. Fighting fire was one thing, but fighting a well developed specimen of a bear with axes was quite another, and no doubt, after some forty-eight hours' strenuous labor, discretion in this instance was the better part of valor. The rangers retired disconsolately, resuming their journey later in the day, when Bruin had retired to his native fastness to sleep off his involuntary feed of smoke and ashes.

Unfortunately all practical exploration and prospecting are at an end for some time to come over the burnt area, for the ground is many inches deep in ashes, which rise and fill the lungs at each step; besides covering as with a pall the rocks which it is necessary to search.

How this great fire originated in several places at the same time will never be known, and it would perhaps be unfair to hazard a decided opinion. Suffice it to say that carelessness, at least, on the part of some individuals has resulted in the destruction of vast quantities of valuable timber.

Perhaps the object lesson now brought home will be taken to heart by some of those more ignorant prospectors who have openly prayed for fire. "To make the job more easy, by clearing out the undergrowth." That wicked fallacy has been exposed, at a great cost, but if the lesson has been properly learnt, it will be cheap at the price paid, for it will remove a menace to the valuable timber reserves, which are one of New Ontario's greatest assets.

## NOTES.

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A meeting of the National Wholesale Lumber Dealers' Association was held in Ottawa, on the 16th, 17th and 18th August. The Convention was more in the nature of a pleasure trip than a business meeting. The two chief questions discussed were insurance and car equipment. On the latter it was decided that joint action should be taken to compel the railway companies to furnish proper equipment as for other industries and shippers. In shipping, the lumbermen have to construct their own racks and stakes on flat cars, such costing about \$6 per car, while no allowance is made in freight rates to offset this expenditure.

The meeting was addressed by Mr. E. Stewart, Dominion Superintendent of Forestry, who spoke on the question of the management of pine limits such as are found in Ontario. He urged the desirability of preserving the small timber and of a careful examination and survey of limits to ascertain their condition in respect to the stand and new growth. He concluded as follows:—

Considering all these facts, it seems to me certain that not the least valuable part of many limits is the younger growth, which at present, as I have endeavored to show clearly, does not pay the cost of cutting, and that the owners of timber, especially of white pine, would only be acting with the foresight they show in other matters connected with their business if they gave greater attention to this matter than heretofore. The time has arrived when the man who directs the lumbermen's operations in the woods should have, in addition to his practical knowledge of how to cut and take out logs to the best advantage, also some knowledge of the tree itself; the manner or rate of its growth and how to cut other timber so as to foster that growth. In other words he should be a forester, as well as a practical log man, and it is fortunate that many young men, most of whom have been brought up in our rural districts, are now studying forestry in the colleges of the United States and spending their vacations in our lumber woods, studying the practical part of the business; and I would strongly advise our lumbermen to avail themselves of the services of these young men, rather than import professionals from Europe, who are necessarily less familiar with conditions.

Some of the old enactments in regard to forest protection are both quaint and interesting. Attention is called to one such instance in a recent work on Alfred the Great. The Law-book in use previous to that issued by Alfred was that of King Ina (688-726).

In the case of damage to a wood, this old law drew a distinction between injury by fire and injury by the axe, and that by fire was punished far more heavily than the other, for this assigned reason---that fire is a thief and works silently, whereas the axe announces itself.

"In case anyone burn a tree in a wood, and it come to light who did it let him pay full penalty, let him give sixty shillings, because fire is a thief. If one fell in a wood ever so many trees and it be found out afterwards, let him pay for three trees, each with thirty shillings. He is not required to pay for more of them, however many they might be, because the axe is a reporter and not a thief."

"This contrast could be retorted: for it might be urged that if fire is a thief relatively to the owner of a wood, so is it also relatively to the defendant, for it had started up afresh when he had left the place thinking that all was safe. The worst that could be proved on him was the want of sufficient caution. In fact the law is only good as against arson, wanton or malicious; and for that case it is not severe enough. It may be assumed that in the bulk of cases damage by fire would be undesignated and accidental.

"But where the axe is used there can be no doubt about the motive. The man who fells another man's timber does so plainly with intent to steal, and the noise of the axe is not extenuating but rather aggravating by reason of its audacity.

"In Ina's law all such considerations were prevented by two venerable maxims which said, 'Fire is a thief but the axe is outspoken.' Moreover, as an indication of the national instinct which is favorable to whatever is open and straightforward, it may be interesting; but the distinction was bad as law, and it was abolished by King Alfred. His new law equalized the penalty thus: 'If a man burn or hew another man's wood without leave, let him pay for every great tree with five shillings, and afterwards for each, let there be ever so many, with five pence; and a fine of thirty shillings.'"

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The following extracts from an official report of the United States Bureau of Forestry on Forest Conditions in Northern New Hampshire are of interest to Canada:—

The total amount of wood consumed by the mills in this region (310,795,000 ft. B.M.) exceeds the total cut by over



37,000,000 board feet. Moreover, a large part—over 24,000,000 board feet—of the wood cut goes to outside mills; therefore, the actual excess of wood consumed over the amount received from this region is over 61,000,000 board feet, and constitutes nearly 20 per cent, of the wood consumed in Northern New Hampshire. This is explained by the fact that most of the pulp companies are preserving their own supply of timber, preferring to draw upon an outside source, *chiefly Canada*, and that the demand for wood, especially spruce, is greatly in excess of the supply.

The wood consumed by pulp mills in Northern New Hampshire from 1st July, 1902, to 30th June, 1903, was 271,604 cords, 138,131 cords or 50.9 per cent. being from that district, 101,911 cords or 37.5 per cent. from Canada, and 31,562 cords or 11.6 per cent. from Maine.

The combined holdings of timberland by pulp and paper mills in Northern New Hampshire are 488,290 acres. This acreage includes the great bulk of virgin timberland in the region. The owners are thoroughly alive to the importance and farsightedness of a policy of perpetuating their supply of timber and, as a means to this end, with a view to cutting as little as possible from their own land, at present, they are getting a large part of their supply from farmers' wood lots and Canada.

The question was asked the various pulp mill owners as to the length of time the present supply of spruce might be expected to last, and also as to the substitution of another species for pulp when the supply should have been exhausted. Their replies certainly indicate that they are not anticipating a spruce famine in the near future, and that they will not worry over a substitute for spruce until the available supply of spruce in Canada is exhausted.

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Forest fires have done considerable damage in different localities during the late summer.

As the result of bush fires in Nova Scotia the village of Belmont was almost wiped out of existence in the latter part of August. Newspaper reports give the damage at \$35,000, and it was also stated that there would no doubt be considerable distress amongst a number of the losers, some of them having nothing left but the clothing they wore. There had been no rain for some time, and everything was dry enough to burn easily. High winds caused the fires to spread and considerable damage was done in other localities. One fire is stated to have been caused by the gross carelessness of one person, who was trying to clear some land and fired it when the wind was blowing a gale.

In the vicinity of Moncton in New Brunswick, serious fires occurred at the same time, and there has probably been considerable loss of standing timber. Mill property was in great danger and it required the exertions of a large number of men to keep the fire in check. Farm buildings were destroyed in several cases. In Moncton the fire brigade was kept in readiness as the burning leaves and twigs were falling in the town, but fortunately its services were not required. The dry season resulted in a great many fires, most of which probably did not reach large dimensions.

Reports from British Columbia are to the effect that there were large and destructive fires along the coast from Alaska, southward, particularly along the White Pass and Yukon Railway, where they are ascribed to fires carelessly left by campers, and on Vancouver Island.

A despatch from Rossland, of the 4th September, gives a description of what is stated to be the most extensive and destructive forest fire since the founding of the town. It swept a distance of six miles, and its path was a mile wide. It destroyed the standing timber on over 5,000 acres, and it is stated that 32,000,000 feet of timber was burned. The property of several mining companies was threatened and in some cases partially destroyed.

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On the question of adulteration of maple sugar, Mr. Madden gave the following testimony before a Committee of the House of Representatives of the United States, which we leave to the discretion of our readers to accept or reject:—

“Now we have found by experience—not by chemical analysis, but by experience—that the maple sugar made from the sap of the maple tree in Ohio is not so strong as the maple sugar made from the sap of the maple tree in Vermont, and that the maple sugar made from the sap of the maple tree in Vermont is not so strong in flavor as that which is made in Canada, in Quebec Province, because it seems that the colder the climate the stronger in flavor the maple sap is.

“Now, we buy these various sugars and reduce them to a liquor to make maple syrup, and I will give you my word, gentleman, if we take a Canadian sugar, which is the highest priced maple sugar we have, it being worth at the present time 12 cents a pound, while Vermont is worth only 8 cents a pound—I give you my word that if we make a liquor by melting that Canadian sugar, without the addition of sugar to reduce the strength of the flavor, it is so strong you could not use it.”

## REVIEWS.

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*Report of Dominion Experimental Farms for 1904: Dr. Wm Saunders, Director. Pp. 509.*

This report comprises, in addition to the general survey by the Director, the reports of the officers having charge of special departments, and of the experimental farms in the different provinces. The report of Mr. W. T. Macoun, the Horticulturist at the Central Experimental Farm, gives some interesting information in regard to the forest belts, as follows:—

“It has been found that the trees which were planted 5 by 5 feet apart, the closest distance used at first, are making the best trees from a forestry standpoint as the side branches are killed much sooner. The trees planted 5 by 5 feet apart are more protected from storms than those farther apart and hence the tops are less injured. They are also a little taller in most cases, but are not so great in diameter as those 10 by 10 feet apart. During the first years of growth there is a great advantage in having the trees close as in order to get thrifty growth the soil should not become hard, nor should the trees be almost smothered with weeds or grass, and to get these good conditions it is necessary to cultivate at first, and the farther the trees are apart the longer one will have to cultivate, thus making the expense greater.

“Until the last three years the trees in the mixed plantation were making the most satisfactory growth, and are yet making better growth than some of the clumps composed of single species, but the rapid growing kinds are developing so fast in the mixed belt that they are overshadowing some of the more valuable trees, and those which cannot endure much shade are being killed. To some extent this overshadowing is prevented by shearing the side branches and letting in more light.

“In some of the clumps of single species the disadvantage of not having two or more kinds mixed is quite as apparent as the disadvantage of having so many kinds mixed in the mixed belt. Ash, Butternut, Black Walnut and Elm, which have thin foliage, do not kill the sod, and the growth on this account is checked. If other heavy foliaged kinds, such as Larch, Spruce, Pine or Box Elder, had been mixed with these the results would have been, almost certainly, much better.”

Dr. Jas. Fletcher, the Entomologist, gives descriptions of the principal forest insects observed to have been destructive during the year. The Ash Leaved or Manitoba Maple appears to have had the largest number of enemies. They include the Basswood Looper, which destroys the leaves, the Negundo Twig-borer, which the name sufficiently describes, and the Negundo Plant Louse. In regard to the last, Dr. Fletcher states that when not controlled by spraying with kerosene emulsion or whale oil soap solution, these plant lice do serious injury to the trees they infest; and they are so persistent in their attacks that many lovers of trees in the West have given up the cultivation of the desirable and quick growing Negundo for other trees less subject to insect attack.

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*Summary Report of the Geological Survey for 1904; Dr. Robert Bell, Director. Pp. 392.*

This report contains the accounts by the different officers of the survey, of the explorations and surveys made throughout the Dominion during the season. While they relate mainly to the geological features of the country there are some notes in regard to forests and timber that are of interest.

The district at the headwaters of the Albany and Severn Rivers, which will be near the line of the new transcontinental railway, presents some interesting features in tree distribution. Spruce, poplar, banksian pine and birch are found everywhere over the whole district. White and red pine were noted only at the southern part of Lac Seul. One solitary white pine tree occurs on Slate lake, and this appears to be the northern limit of the tree in this district. Ash trees were observed here also for the last time on the way north. The white cedar is a rare tree; and this is its northern limit.

Large areas have been burnt along the route of the Wenasaga river, notably at Wenasaga lake, ten or twelve years ago, and at Big Portage lake, about five years ago: also on Gull lake. North of Cat lake, we enter, at the lower end of Cedar (Kishikas) lake, an area that has been burnt probably eight or nine years ago, and this extends to a few miles below the mouth of the Francis river, or a distance of over thirty-five miles. Eastward it extends at least to Windigo lake, ten or twelve miles to the right of the river, and westward as far as could be seen from the tops of the highest hills. This is generally being reforested with a second growth of banksian pine and poplar.

In very few places, either on the north or the south sides of the height-of-land, do the spruce and tamarack attain such a size as to make them economically important to the lumbering



industry. On the shores and islands of Birch lake the best timber occurs; that on the branches of the Severn river is generally small.

At Fort Hope fairly clear nine-inch lumber was being sawn from trees cut near the shores of Eabamet lake. One tree was felled that gave a log over two feet thick at the butt and 100 feet long. The greater part of the forest is about eighty years old, though in places trees reaching 140 years were found. These old trees were on low-lying areas, that had escaped where the higher and dryer parts were burned, and were not generally large. Their growth-rings showed a rapid increase in size for the first fifteen years and afterwards an extremely slow growth. The large sandy tracts are now, for the most part, covered with an open growth of banksian pine, a tree of small commercial value. When the day comes in Canada for reforestation, these districts might be replanted with pines commercially valuable. Over large areas the spruces would, apparently, if more accessible, be available for wood pulp.

It was thought that the larch saw-fly, which destroyed so much of the tamarack of our northern forests, had ceased its depredations, but Mr. McInnes found it still active in this district. He states that the depredations of the larch saw-fly upon the tamaracks along the Winisk river were noted in the previous year's report. Since that time the ground covered by this insect has been extensive, and some idea of the damage it has done may be given. Last season all trees along the Winisk river, from a point near the mouth to a point within a few miles of the Weibikwei lake, were stripped; south of that area they were untouched. During the present spring and early summer their ravages extended southward to the Albany river and westwards for sixty miles up the Winisk river and to about midway between Eabamet lake and Lake St. Joseph, on the Albany, an area of about 14,000 square miles.

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*Forest Conditions of Northern New Hampshire, by Alfred K. Chittenden, M.F.; Bulletin No. 55 of the U. S. Bureau of Forestry. Pp. 100.*

This is the report of an investigation of the forests of Northern New Hampshire, made under instructions of the U. S. Bureau of Forestry. The territory included in the investigation embraces a total of 1,951,977 acres or 32 per cent. of the entire State. It contains the entire White Mountain region and is drained by four large river systems, the Connecticut, the Penigewasset, the Saco and the Androscoggin, all of which have their origin within this region. The White Mountains occupy

the southern and larger portion of this area, and here the country is very rough and rugged, broken up as it is into many short mountain ranges and deep narrow valleys. The northern part of the area is flatter and contains many lakes and mountains with wide, rolling valleys between. The entire region is essentially a forest country. That the land is, for the most part, better suited to forest production than to agricultural use is evidenced by the thousands of acres of once cultivated land, which have now largely come up to dense forests of second growth spruce and pine. 900,000 acres of the tract are held by large lumber and pulp companies; 756,000 acres by small holders of forest lands, and 244,000 acres are in small agricultural holdings. These lands were sold by the State in years past. The best spruce land brings from \$20 to \$30 per acre. Second growth spruce land is rapidly increasing in value, and is being bought up by the large lumber and pulp companies. Of the virgin merchantable forest there are only 200,000 acres remaining, out of a total forest land area of 1,684,206 acres, the remainder being cut-over or waste land. The stand of softwoods is estimated at 4,764,000,000 board feet.

The conclusions reached by the investigation are as follows:--

(1) Unless the forests are effectively protected from fire, the value of Northern New Hampshire as a summer resort, now the source of an annual revenue of approximately \$8,000,000, and as a source of timber supply, will be seriously affected. The extension from year to year of the total area which has been burned, together with the facts that the great bulk of this land has failed to develop a valuable forest growth, that indeed much of it remains an absolute waste, and that the forest resources of the State are being rapidly depleted, has forced on all thoughtful persons interested, financially or otherwise, the recognition of the fire question, as the question of first importance to the forests of the State.

(2) Safety from forest fires is impossible without the organization of a fire service, and it is suggested that the State should organize such a service, raising the necessary revenue by a tax on the timber lands.

(3) Conservative lumbering under the supervision of trained foresters would pay the large lumber and pulp companies operating in Northern New Hampshire better than the present method. The principal sources of waste at present are in cutting high stumps, in leaving good lumber in the tops, in leaving logs and lodged trees in the woods, in the failure to utilize wind-thrown and dead timber which is still merchantable, in leaving standing merchantable trees which are sure to be wind-thrown,

in the failure to leave seed trees in favorable localities, and in lack of protection of young growth in logging operations.

(4) The conservative management of farm wood lots is practicable and greatly to be desired.

(5) Forest planting upon denuded lands unsuited for agriculture promises good returns.

(6) There should be a chief fire warden, who should also be State forester, who should maintain a State forest nursery, for the distribution at cost of forest seeds and seedlings, and should bring about by lectures and instruction on the ground a better management of forest lands within the State.

(7) Since an excellent opening exists for the creation of a forest revenue by the purchase of cut-over lands in the mountains, the adoption of a policy looking to this end is recommended. Such lands are for sale at from \$1 to \$3 per acre.

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*Future Forest Trees: A. Harold Unwin, D. Oec. Publ. (Munich).  
T. Fisher Unwin, Publisher. Pp. 108.*

This volume by Dr. Unwin, formerly of the Forestry Branch of the Department of the Interior, is issued with the object of presenting in a concise manner the results of numerous experiments, made chiefly in Germany, with some American trees in order to show their forestal value in Europe. The papers of which this book are composed, appeared first in German, but it was considered advisable to make the information available for English readers. Tables are given of the imports of timber into Germany from the United States and Canada, and are followed by a list of the different species of American trees which have been tried in Germany, with a statement of the results of the experiments in each case.

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*The Selkirk Range; A. O. Wheeler, F.R.G.S. Government Printing Bureau. Pp. 459.*

This is a description of the Selkirk Mountains of British Columbia, which are becoming a favorite resort for the traveller who desires also to be a mountaineer. It is narrative in form so as to be easily readable, but gives a mass of valuable and reliable information in regard to the history, topography and natural features of the district. The illustrations include views of the beautiful mountain scenery and of the game and other products of the country, which add much to its handsome appearance.

*The Determination of Timber Values*, by Edward A. Braniff, Forest Assistant, U. S. Bureau of Forestry. Reprint from Year Book of Department of Agriculture, 1904. Pp. 7.

This pamphlet gives the results of experiments made with yellow birch, sugar maple and beech, in the hardwoods, and long leaf pine in the coniferous woods, to ascertain exactly how much more valuable is a particular kind of a tree of a certain size, than another tree of the same kind and smaller size. Trees were followed accurately from the mill to the lumber yard, and the ultimate result of the calculation was that cutting birch and maple trees 17 inches and over, the profit per thousand would be \$5.64; trees 8 inches and over, \$6.04; trees 19 inches and over, \$6.46; 20 inches and over, \$6.91. Tables are given of the contents, values, &c., of the trees at the different diameters. The experiments will be continued with other trees. The results of this work will be useful to lumbermen in calculating the value of their hardwoods.

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*The Maple Sugar Industry*, by Wm. F. Fox and W. F. Hubbard, and *The Adulterations of Maple Products*, by H. W. Wiley. Bulletin No. 59, U. S. Bureau of Forestry.

This is an interesting sketch of the history and present conditions of the maple sugar industry in the United States. New York, Vermont and Ohio are the great producing States, as they are the chief home of the hard maple (*Acer Saccharinum*) which is the main source of the supply. The black variety has the highest reputation as a sugar producer. Sap is also obtained from the red and silver maples, but is not considered of as high value. The management of a maple sugar wood presents different problems from a lumber forest as the object is not to produce long, straight trunks but to develop good heads of foliage, as the quantity and richness of the sap depend largely on this being provided for. At the same time forest conditions must be maintained. The bulletin gives instructions as to the best methods of treating different kinds of groves so as to bring them into the proper condition to furnish the largest product.

Adulteration appears to be a common practice with maple products, as it is stated that the greater quantity of maple molasses or syrup on the market is adulterated in the true sense of the word. One of the most common adulterants is glucose, but sorghum or sugar cane is also often mixed with it. None of these mixtures are necessarily harmful, but the great objection is that the makers of the genuine article are forced into competition with these extensive adulterations, thus lowering the legitimate price. Every grove of maple trees would be



worth a great deal more to its owner if the laws should be so framed as to eradicate the evil. Such laws would permit the sale of the mixed goods under their proper names, and thus protect both the manufacturer and the consumer. It may be added as an interesting item that chemists have not yet been able to determine the exact chemical composition of the peculiar flavoring of the maple.

*Report of an Examination of a Forest Tract in Western North Carolina, by Franklin W. Reed. Bulletin No. 60, U. S. Bureau of Forestry.*

This is a report of an examination of a forest tract of about 16,000 acres belonging to the Linville Improvement Company, whose main purpose is to develop it as a summer resort. The report suggests plans for deriving a revenue from the timber on the tract, and at the same time preserving and even increasing its beauty.

#### REPORTS RECEIVED.

*The Red Gum, by Alfred K. Chittenden, M.F. Bulletin No. 58, U. S. Bureau of Forestry.*

*Progress of Forestry in 1904, by Quincy R. Croft, and The Attitude of Lumbermen towards Forest Fires, by E. A. Sterling. Reprinted from the Year Book of the U. S. Department of Agriculture, 1904.*

*Terms used in Forestry and Logging. Bulletin No. 61, U. S. Bureau of Forestry.*

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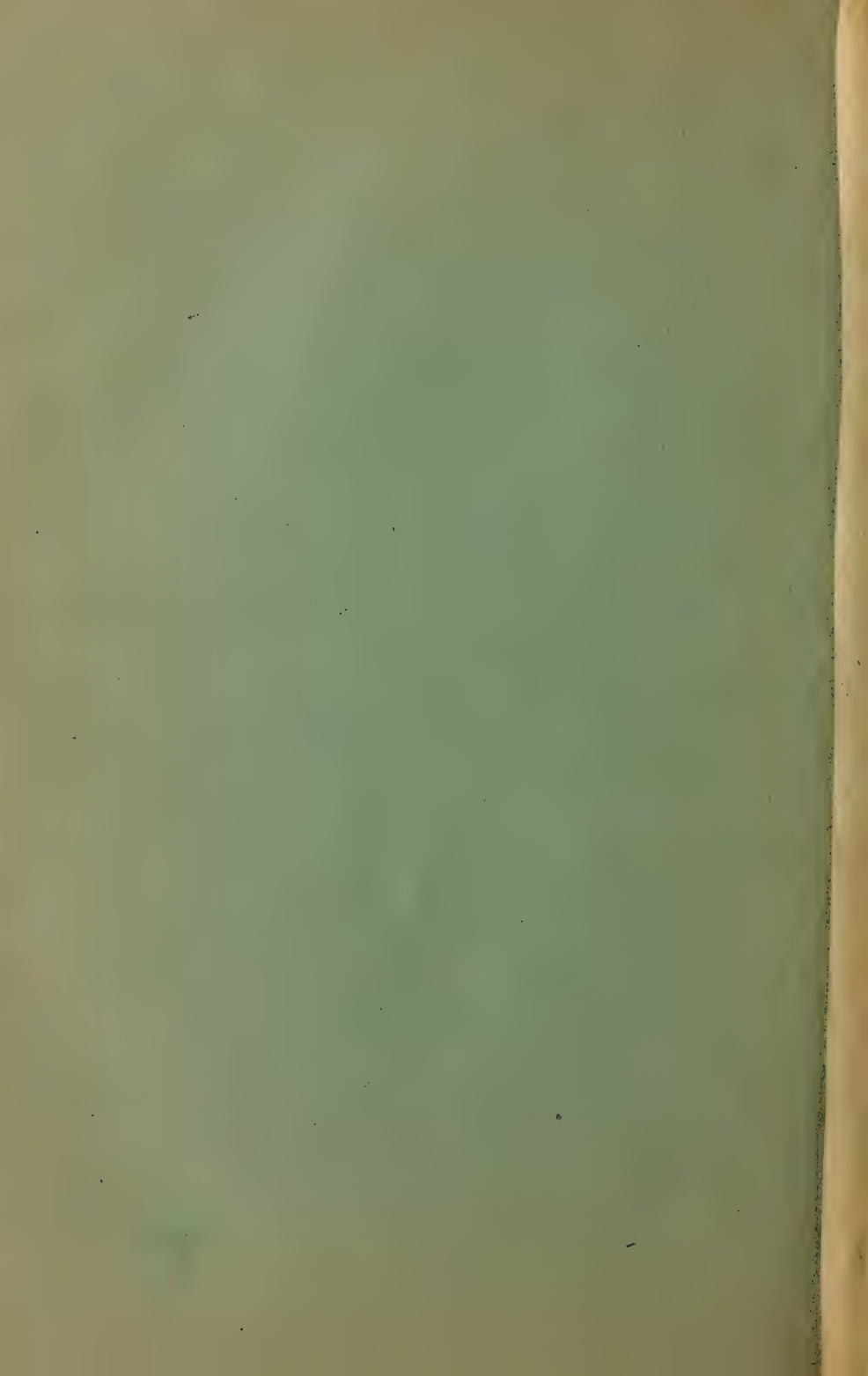
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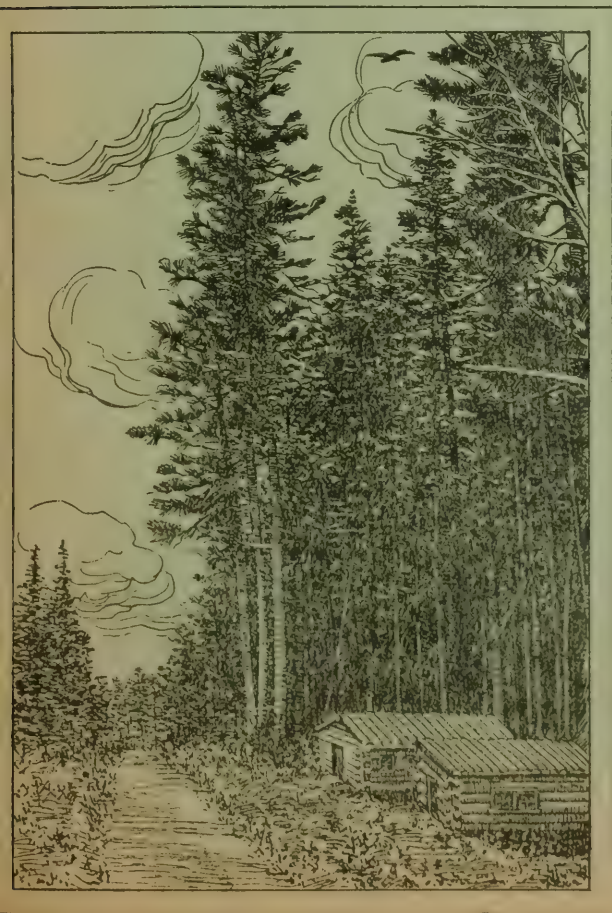
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**FEBRUARY**  
**1906**



**PUBLISHED AT OTTAWA**  
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**CANADIAN FORESTRY**  
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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

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# Canadian Forestry Journal.

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VOL. II.

FEBRUARY, 1906.

No. 1

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## CANADIAN FORESTRY CONVENTION.

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The first Canadian Forestry Convention held under the auspices of the Canadian Forestry Association, was opened in the Railway Committee Room of the House of Commons, Ottawa, at 10 a.m., on Wednesday, January 10th, 1906.

There was a large attendance of representative men from all parts of the Dominion, as well as a number of leading foresters from the United States.

The meeting was called to order by the right Honourable Sir Wilfrid Laurier, G.C.M.G., Prime Minister, who invited His Excellency the Governor General to open the Convention.

HIS EXCELLENCY THE GOVERNOR GENERAL—Sir Wilfrid Laurier, Ladies and Gentlemen, it is my privilege to open this Forestry Convention which has met in response to the invitation of the Prime Minister to consider, and before it is too late, questions of the highest importance to the future well being of the Dominion. I do not propose to anticipate with more than a very few remarks of my own the addresses of the distinguished gentlemen who have been requested to place the results of their experience and their counsels at the disposal of those who form the opinion and make the laws of the Dominion. I will only say that although my experience of Canada has been comparatively short, it has yet been sufficient to impress me with the urgent desirability of focussing the best brains of the Dominion on the immediate consideration of what shall be done with regard to our forests in order to protect the soil on which the maintenance of our agricultural prosperity depends.

I have myself seen in India, in Asia Minor, in Greece and in Italy, extensive tracts of territory once inhabited by a strenuous, prosperous, numerous population, and now reduced to the misery of a barren desolation by the unregulated deforestation of their lands by a blind and selfish generation which had no regard for

posterity, and no eyes for anything but their own immediate requirements.

Gentlemen, there are no more melancholy reflections than those suggested by the sight of a country, once rich and equipped with all the majesty and panoply of power, which has become a waste and a stony desert through the reckless improvidence of its own people.

It is the object of this Convention to fix the attention of the people of the Dominion on the warning which these and other countries hold out to us as to the practices we should carefully avoid, if we are in earnest in our hope that our beloved Canada may fulfil the high destiny which will be fulfilled if this generation is gifted with sufficient foresight and self-control to husband the resources so abundantly lavished upon it by a bountiful Providence.

It is because I hope that this Convention may be the means of averting from every part of Canada the sad fate of those countries to which I have referred that I have gladly accepted the request that has been made to me to open this Convention. I sincerely hope that the results which will flow from the Convention he has called will realize the hopes of Sir Wilfrid Laurier. I am glad to see so many here and I note with peculiar satisfaction the presence of the eminent gentlemen from the United States who have come here in a spirit of fraternal sympathy and co-operation to give us the great help of their assistance. I now, with great pleasure, declare this Convention open.

SIR WILFRID LAURIER—In the name of the Canadian Forestry Association which has conceived and planned this Conference and in the name of the Canadian Parliament, which has authorized and approved it, it is my privilege and my pleasure to extend to you all a most hearty greeting. Welcome to one; welcome to all. Especially should I welcome, even after the words of His Excellency the Governor General, the representatives of the American Republic who are present with us on this occasion, and who bring to us the benefit of their knowledge and experience. Welcome also to the representatives of the Provincial Governments, without whose aid and co-operation our efforts could never have the full fruition which we anticipate from them. Welcome also to the representatives of the great railway companies which are placed in a position to give, perhaps more than any other class of the community, the benefit of their experience and knowledge to us. Welcome also to the representatives of the great lumbering class, who, perhaps, are more interested than any other class of the community in the maintenance, preservation and protection of the forests. Welcome to the University men whom we see afore us, welcome to the traders, welcome to the sportsmen,

welcome to all classes who are present and who are ready to contribute of their time and of their money to the great object we have in view and which is an object of primary national importance. The large attendance which I see before me, I am most gratified to say, exceeds all the expectations that we had and this attendance, large as it is, is a manifest evidence that the Canadian people at last,—at long last realize the great importance of all problems connected with forestry.

A great deal of harm has already been done, harm, which, I am afraid, in many respects cannot be recalled, but it is not yet too late and the harm which we know has taken place is and ought to be an incentive to us to do our best in the endeavor to check it, and to give more attention to forestry problems. Our ancestors, when they came to this continent, found it an unbroken forest from the shores of the Atlantic Ocean to the Mississippi Valley. It was the home of a race of hunters who derived their existence chiefly from the chase and for whom therefore the forest was a natural element. It was the object of our ancestors to turn this land into a fit habitat for a race of agriculturists, for the white man whose civilization is based primarily upon agriculture. They had to clear their homes from the forest with care and tenderness, they looked upon it as an enemy to be got rid of with the axe, with fire, and with every mode of destruction. History tells us and our own experience tells us that they went at it most mercilessly. The forest had no friends whatever, because, to clear off a few acres of land they would set fire to miles upon miles of the noblest trees that ever lifted their lofty heads towards the heavens. This, at one time or other went on in every part of the continent and even at this very day it is going on in some part of the continent. These pioneers of former days, as the pioneers of these modern days, did not realize, did not appreciate that in the economy of nature forests are just as indispensable to the civilization of man as tilled fields. They did not appreciate that even from the point of view of agriculture unless tilled fields are furnished by forests with moisture and rainfall they decrease in their productiveness accordingly, and that the efforts of the agriculturist will suffer in proportion. We have assembled here in order to devise ways and means, if possible, first of all to check this evil and to make every class in the community realize the great importance of maintaining, preserving and protecting our forests. What I would like to call the attention of this Convention to, in the first place, would be the necessity of establishing, if it has not been done, and it has not yet been done, a preserve, a large forest domain. We must know now the experience of those nations to which His Excellency, in his address, has just alluded, teaches us that there are certain portions, certain sections of the earth's surface, which, in the wise economy of nature, must always



be maintained as forests and that our water-sheds must be kept in forest. All the hills, mountains and plateaus which are the sources of flowing streams or rivers should never be allowed for any consideration whatever to remain anything else than forest. No consideration whatever should allow these portions of the earth's surface to be denuded of their trees. We know the consequence and therefore it is needless for me to dwell upon that feature; it is a mere truism.

But, what I want to call your attention to is that if these portions of the earth's surface in our own country are to be maintained as forests it is essential, in my humble judgment at all events, that they should form part of the national domain, that they should belong to the state. In Canada by the State I mean the provincial governments, where the management of the public lands is left to the provincial governments, and the national government where the ownership of public lands is left to the national government. If it so happens, and I am afraid it has happened, that some portions of these watersheds have been alienated from the public domain and have been transferred to private ownership it should be the policy of the National Government, and it should be the policy of the provincial governments, to repurchase these lands and bring them back to the public domain.

The state of New York has inaugurated such a policy. The state of New York years ago made the mistake—I was going to say committed the folly, and perhaps that word would not be too strong—of alienating part of the watershed of the Adirondack mountains. We know the fatal consequences that have arisen from that policy in the droughts which have, more than once, been the bane of that beautiful state. And now, I understand, the legislature of the state of New York has passed laws authorizing the administration, as fast as possible, to re-acquire these lands and make them a part of the public domain. If, in any part of Canada, a similar mistake has been made, a policy such as that adopted by the state of New York should be adopted here, and the national or provincial governments whose business it is should make it their object to bring back to the public ownership the lands that have been alienated, and make these forests a part of the national domain, as is done in Germany, France and some other countries (Applause). On this point, I am sure, we all agree.

The next consideration for which I would ask the deliberation of this Convention is the reproduction of the forests. Our system of treating the forests is to lease them to the lumbermen for the purpose of taking off the merchantable timber. I do not know whether this policy is advisable or not. I believe that, on the whole, it is advisable. But no effort is



made to replace the timber that is taken away from what we call the limit under that policy. In Germany and France, I understand, it is the accepted policy, a policy that has been followed for generations, that, when a tree is removed in any way to replace it by the planting of another tree (applause). I am not prepared to say that such drastic conditions should be imposed upon the lumbermen,—though I am not prepared to say, on the other hand, that a plan of this kind should not be taken under advice. At all events, I submit to this Convention that we ought to do something more than we are doing at the present time (hear, hear). It is not fair to the country—it is not fair to us who are living and still less is it fair to the generations to come after us—that we should allow the destruction of the forest to go on year by year by the cutting down of the trees and make no effort whatever to replace what is thus taken away. The trees are a crop like any other growth. True, they are a crop of slow growth, but that is the only difference between trees and any other crop. In this, as in every case, when a crop is taken off, steps should be taken to replace it at once with another. I said a moment ago that I was not prepared to say that when the lumberman, in the course of his work takes away, say, 300,000 trees in a year he should at once plant 300,000 trees. But I do ask this Convention to consider what should be done in that matter. One thing might be asked, whether of the lumbermen or of the State that, where trees are taken away, trees should be seeded, so that we may have a crop coming on all the time. It is a fact which we face with some degree of sadness, even to mourning, that Canada, in a few years, will be devoid, absolutely devoid, of the beautiful pine forests which at one time were its pride. We can calculate the number of years—and the number is not very great, when there will not be another tree of the original forest to be cut upon the limits of the Canadian lumbermen. But, trees have grown and trees ought to grow again. There is an impression which I have heard expressed on more than one occasion, that it is useless to look for another crop of pine trees—that when you have removed the crop we found here, the growth of many years, the new crop of trees will be spreading and of no merchantable value. But I am told that there is a way whereby a new crop of trees can be grown. The growth should be started as soon as the original trees have been removed from the soil. A few years ago I was discussing this subject with a lumberman of great authority, a man known to some of you, the late John Bertram, a man most eminent in his profession and of the highest capabilities in many directions. He told me that, on his limits on Georgian Bay, he had a young crop of pine when he had started a few years before. The explanation he gave me was this—and I am glad to give here the information he imparted to me so as to gain the opinions of those

who have experience in these matters—he told me that, when the crop of pine was cut off, the new crop to spring up would consist largely of poplar, and poplars grew faster than the pine or hardwood trees. And he said:—If you take care to plant pine seeds underneath these poplars, the young pines will grow up shaded by the faster-growing trees. The pines, in their efforts to reach the sunlight will grow tall and without limbs. After a time, when they overtop the poplars, their life is assured. If this be the case, it seems to me we have here a method of reproducing our trees and of having, for all time, a constant supply (applause). It is a natural thought that we shall not live to see this young generation of trees at their full growth; but, as has been stated a moment ago by His Excellency the Governor General, we must not think alone for ourselves, we must think of the prosperity of Canada in the days when all of us shall be sleeping in our graves. This is the sentiment, I am sure, that actuates this entire assembly. (Loud applause.)

The next thing I would like the Convention to consider is the protection of the forest against its many enemies. For the forest, unfortunately has many enemies. Man is bad enough we all agree; but man is not so bad as the insects, and the insects are not so bad as fire. The fire is the great enemy of the forest. Nothing can be sadder for us to consider than that, during the summer months there are miles and miles of forest destroyed by fire. This goes on every year. Speaking of my own experience, it has been going on every since I can remember. It goes on, perhaps, not to so great an extent as in former years, but there is far too much of it yet. (Hear, hear.) I was talking, a few years ago, with one of the lumbermen of the city of Ottawa, and he made the statement to me that the enormous quantity of lumber taken to market out of the Ottawa valley does not represent more than ten per cent of the timber that has been destroyed by fire. If this is a true statement the fact is simply appalling. Last week, I met one of the lumber kings of the Ottawa valley, who asked me, "What are you going to do at this Forestry Convention?" I said, "We are going to compel the lumbermen to protect the forest against fire." He replied, "Why, the lumbermen are doing more in that direction now than all the rest of the community put together." I said, "I quite believe it. But that is not saying very much for the lumbermen—(applause and laughter)—because the rest of the community does absolutely nothing to protect the forest, and the lumbermen may well be doing more without doing enough." (Applause.)

What measures ought to be taken to protect the forests against the raging fires that every year consume such an appalling quantity of the best timber of the country. I know that some

effort has been made in this direction. I know that the lumbermen keep a patrol of the woods of the Ottawa valley. And that is a great improvement. But I submit, that this is not enough. I submit that something more ought to be done, if it be only to have more patrolmen. I believe that we should have the woods patrolled as they are in Germany and France, so that, as far as possible, every incipient fire should be prevented from spreading. Moreover we should impress every man in Canada—the lumbermen, the sportsmen, the man out of any class—with the belief that it is a crime, an absolute crime to throw a lighted match upon the ground—(applause)—, to scatter the ashes of a fire, or to leave a camp fire before it is absolutely extinguished (loud applause). All these things are crimes and I would go so far as to say that they should be made crimes under the law.

There is another mode of destruction to which I want to call the attention of the Convention and it is the destruction of the railway locomotive. The railway locomotive is a great blessing undoubtedly, and I am not here to say anything harsh of it, but if you take the train at Halifax to go to Vancouver, in every province of the Dominion, where there is timber, in Nova Scotia, in New Brunswick, in Quebec, in Ontario, in British Columbia, you will see miles and miles and miles of what was once beautiful forest and which is now nothing but parched and blackened timber, a monument to the destructive power of the railway locomotive. I know that the railway men have done a great deal to obviate this evil. They have used all possible ways of overcoming the difficulty inherent to the operation of the railway locomotive. They have put screens upon their stacks, they have devised different methods, but all these methods have been inadequate and I do not know that in that direction they can do more than they have done, but perhaps the railways ought to be compelled in the summer season, at all events, to have extra patrolmen on their tracks so as to prevent incipient fires, to follow sparks in their progress and to extinguish them before they have caused any damage. I think that is one question that ought to be carefully considered by this Convention and I believe that if it were to do nothing more than to prevent fires by railway locomotives this Convention would have done a great deal, but I think it will do more than that.

There is another subject to which I would also invite the attention of the Convention. That is tree planting. It is not sufficient that we should preserve our forests where we have forests. It is not sufficient that we should plant forests also to a great extent, but we should invite people generally to give more attention to tree planting at their homes and especially upon their farms. The Canadian Government, some eight years



ago, introduced into one of its departments a forestry branch. It has done a great deal of good in that respect and I hope that Mr. Stewart, who is the administrator of this branch, will give us some information as to the work which he has done. It has done a great deal already to my certain knowledge and to the knowledge of everyone who has been in the North-West. It was my privilege last September to visit the Province of Manitoba and the new provinces of Saskatchewan and Alberta. Fourteen years had elapsed since I had seen them before and of all things which struck me in this wonderful country the thing which perhaps gladdened my heart more than anything else, is the attention which is given to forestry. Fourteen years ago when I first visited the Province of Manitoba and the Territories of Alberta and Saskatchewan the farms were absolutely barren of trees; you could not see a tree around them. Now, I am glad to say that around most of the farms of Manitoba and many in Saskatchewan and Alberta you can see groves of trees. The City of Winnipeg in that respect is an example to the cities of the east. The City of Winnipeg has done marvels in the way of tree planting. The streets of Winnipeg to-day are a credit to that city and would be a credit to even an older city than it is. But, there is a great deal to be done in the east and in that respect perhaps my own province of Quebec is the greatest sinner. My own countryman, the French-Canadian, is the man with the axe. There is no better man in that respect than he. He goes into the forest and there is no man who can equal him in forest work, but, in the meantime, he has not been as careful as he should have been in preserving the trees in his midst. I should like to impress upon every Canadian farmer the necessity of covering with trees every rocky hill and the bank of every running stream. It is very easily done. He has only to scatter the seeds on the ground, fence it and nature will do the rest. These are some of the questions which I hope will be taken into consideration by yourselves. I do not intend to limit the number of questions which shall be taken into consideration but these are some to which, with others, I invite the serious attention of this Convention. I have much pleasure in calling upon Mr. R. L. Borden, the leader of the Opposition in the House of Commons.

MR. R. L. BORDEN.—I welcome the opportunity of being present at this Convention and of expressing my appreciation of the importance of our forest resources. To men familiar as you are with the subject all that I can say must seem trite and commonplace; but I venture a few remarks merely for the purpose of indicating my interest in this great question.

Canada is remarkable not only for the extent and variety of her resources but for the diversified nature of the country



and for its remarkable beauty. In the east we have Quebec and the Maritime Provinces with their magnificent coast lines, their forests, their agriculture and their mineral wealth. Thence there extends inland through Quebec and through the sister Province of Ontario the greatest inland waterway in the world connecting the ocean with the broad prairies of the west. Great rivers reach down from the forests of the north. On the western coast we have another great maritime province abounding in forest and mineral wealth.

Of all our wonderful natural resources none are more important than the forests. Their conservation is undoubtedly more vital to our future than is generally realized. "How foolish," says a great authority, "how foolish does man appear in destroying the mountain forests for thereby he deprives himself of wood, water and soil at the same time."

We are apt to regard our forests as limitless and our forest wealth as unbounded; but public attention has already been directed to certain dangers and to some of the more threatening elements of destruction and waste. Something has been done to check forest fires yet what devastation they have wrought. Practical men tell us that twenty times as much has been sacrificed to flame as to the lumberman's axe. An illustration mentioned at the last session of the Canadian Forestry Association may be given. A settler in the Province of Quebec in order to clear the ground for a five bushel crop of potatoes started a fire that destroyed three hundred million feet of pine which to-day would be worth \$3,500,000. Measures have been taken in many of the Provinces to prevent such destruction, but those who speak with knowledge declare that much yet remains to be done. Many of us although not actually concerned in forestry or in the lumbering industry have had occasion to tramp perhaps for half a day or more through forests ravaged by fire. There one can see the very abomination of desolation spoken of in Scripture. Then follows erosion of the soil consequent on the destruction of tree and plant life and this in turn works similar havoc. The waterways cease to be highways. Rivers cease to be channels of commerce and become raging instruments of destruction.

The importance of the subject has been most forcibly expressed by Dr. Fernow, director of the New York State College of Forestry, and an eminent authority on the economics of forestry. He says:—

"While we are debating over the best methods of disposing of our wealth, we gradually lose our very capital without even realizing the fact. Whether we have a high tariff or no tariff, an income tax or head tax, direct or indirect taxation, bimetallism or a single standard, are matters which concern, to be sure, the

"temporary convenience of the members of society, but this  
"prejudicial adjustment is easily remediable. But whether  
"fertile lands are turned into deserts, forests into waste places,  
"brooks into torrents, rivers changed from means of power and  
"intercourse into means of destruction and desolation—these  
"are questions which concern the material existence itself of  
"society, and since such change becomes often irreversible,  
"the damage irremediable, and at the same time the extent of  
"available resources becomes smaller in proportion to popu-  
"lation, their consideration is finally much more important  
"than those other questions of the day."

Let us consider for a moment the extent of our forest resources in Canada, their value from a mere monetary standpoint and the importance of their conservation. Dr. Fernow estimates that our nominal forest area comprises eight hundred million acres, but that the actual available area does not exceed four hundred million acres. To understand what this implies and what it means to us in the future let us see what has been accomplished elsewhere. In some parts of Europe the forests are under state control, that is to say not only the ownership but the management of the forests is vested in the state authorities. I do not suggest that any such course should be adopted in Canada but we may learn from their experience what can be accomplished by wise measures and careful management. Saxony has under state control 430,000 acres of rough mountain land—an area not larger than an average county in Canada. From this she has taken two hundred million dollars in the past fifty years. During that time the cut has been doubled and is of infinitely better quality than it was fifty years ago. Then, only 17% of the cut was serviceable, now 79% is serviceable and the standing wood in the state forests has increased by no less than 16%. The gross revenue per acre has increased from \$1.75 to \$6.67 and the net revenue per acre from 95c. to \$4.37. Canada possesses a forest area one thousand times greater than that of Saxony. Make all reasonable allowances and then estimate what untold wealth this country possesses so long as the harvest of the forest continues.

What can we do in Canada to conserve our forests? The capitalist desires immediate profit, while the public interest requires that our forest area should be exploited not only with a view to the important consideration of profit but with due regard to continuity and to the preservation of these great natural resources. The forests if judiciously managed may bear a crop once in fifteen or even in ten years. If destroyed the crop cannot be renewed in less than a century. The object to be attained is continuity and conservation of the forests which are to be regarded as capital upon which individual en-

terprise shall not be allowed unduly to trench. We must of course have regard also to the necessity for a certain immediate profit to the capitalist who has invested his money and who has a right to carry on his operations as well as to the requirements of legitimate and bona fide settlement. How shall all these objects be obtained? The state can assist by aiding education in forestry as well as by direct control exercised through state regulation.

Along these lines the Canadian Forestry Association is working. Along these lines it is entitled to and should receive the assistance of our Parliament and Legislatures. I have very great pleasure in assuring you that not only do I take a deep interest in the subject but that I shall be prepared to support any reasonable measures within the limits of federal authority which may be devised for aiding in a work of such vital importance.

HON. FRANK OLIVER, Minister of the Interior—It is a privilege which I appreciate very much to take part in the deliberations of this Convention, the object of which is so important to our country. As the special agent or bailiff of this Dominion Government having the responsibility for the management of its estate, it is for me rather to speak of what has been done, what is being done and what is hoped to be done in regard to the territory in the great North-West which is at the present time under the direct management of the Dominion Government. There the question is the direct opposite from what it is in these eastern provinces. Here the great question is the preservation of the forests with some small part of attention to production. There, the great question is not preservation; it is creation of the forests, with a small part of attention to the preservation of such forests as there are. Everything that has been said here or elsewhere in regard to the necessity of woods to successful agriculture is borne out not only by the scientific knowledge that has been acquired regarding the North-West, but also by the experience of the people who have lived there. It is accepted as a fact that the forest brings rainfall. We know that the forest is an evidence of rainfall and that the forest brings rainfall. It is interchangeable. If you have the woods you have the rain and by getting the woods you get the rain. It was some time before I assumed the responsibility in this connection that the Government took up this question of forestry in the west and while the requirements are so vast as they are—I say vast in comparison even with the available resources of this great country—it cannot be expected that the conditions have yet been met or even measurably met. The area of the North-West is so great and the conditions of lack of forest have prevailed for so many years, for so many ages, it may be said,



and these conditions are so different from those prevailing in the rest of the Dominion that it would scarcely have been the part of wisdom to have undertaken the work of reforesting the prairies on theoretical knowledge or the experience of other countries. Although this is not a conservative Government its measures in this matter have been to some extent conservative. They have looked to action upon known lines and to experiments for something upon which to base their future action.

As regards the preservation of the sources of water supply it is the high or hilly country, which, in the West is generally forested; in fact, in that country forest and hill are so intimately associated that there a piece of woods is often called a bluff, or hill. In the United States the word "bluff" is used to mean a hill, but in the North-West the word "bluff" is used to mean a clump of timber, the idea that there must be a hill if there is timber being so well grounded in the public mind by the facts as they exist. So that, one of the first things that was done by the Government in this matter was to take measures to preserve from deforestation wholly partially forested areas in the North-West by creating timber reservations in these localities. This, however, is a much easier matter to deal with sitting here in this comfortable room in this capital city of the Dominion, than it is where you have to deal with a large number of very energetic enterprising people who require that timber for the preservation of life. It is therefore a question which cannot be dealt with offhand; it must be considered from varying and directly opposite points of view. The Government have necessarily been cautious in this matter but it has made very considerable advances and hopes to make more as circumstances permit. That is in regard to the preservation of forest areas which will preserve the water supply in the surrounding country.

Besides this there is, in the northern and north-western parts of the Territories a very great area of country which is principally forested and there I would like to say that what the Premier has said in regard to the destruction of forests by fires applies to a tremendous extent. I think he said that in the Ottawa Valley the total destruction of timber was 90% by fire to 10% by the lumbermen. I think that in this forested area I speak of in the North-West where the timber is especially valuable because of the requirements of the prairie country the proportion would be 99% by fire and one per cent by the lumbermen. Every year there is a destruction by fire of timber of stupendous value, not so much in money value as in the value that the timber is to the settlers in the adjacent country where there is no timber. A difficulty arises in dealing with this question. There is a vast area of timber which has no immediate money value and



when it becomes necessary for the Government to ask the Parliament of this great country—this Parliament which concentrates the intelligence of Canada—for liberal appropriations for the patrolling and protection of these forests the request is likely to be closely queried as to where the reputation of this Liberal Government for economy has evaporated to. There is in that country a vast area of timbered land and that timber has a value altogether beyond its commercial value. It is being lost year after year to a stupendous extent and if it is necessary to take active measures for the patrolling of these forests to secure their preservation against fire I hope the results of this convention will be of such a nature and will have such weight with Parliament that it will not be difficult to get the money required to secure the protection of these very necessary and valuable forests.

Then, there is the great question of the creation of forests or woods on the prairie. There are limitations in that direction which people in this part of the country can scarcely appreciate. Here you have to actually fight the timber to keep it from growing. I do not find fault so much—if I may be permitted to differ from the Premier—with the instinct of those people in this part of the country which prompted them if they saw a tree, to cut it down, because it was either the people or the tree. If the trees were here we would not be here. The trees had to be destroyed in order that the people might live. But, in the North-West it is different. There, it is difficult to grow trees. There you have the Chinook to contend with and in speaking of the growth of forests in the West I may say that it is not the cold of the winter in the west that prevents forest growth; it is the Chinook wind, the mild wind that changes the temperature during the winter and produces conditions of dryness in the early part of the summer which presents the greatest difficulty in the growth of forests in the west.

The Department is grappling with the question in a conservative, yet in a progressive way; in fact, it has adopted a truly liberal-conservative method of dealing with the question. We have established a forestry station under the superintendence of Mr. Stewart and under the management of Mr. Ross and I, having recently had occasion to visit that locality, have been credibly informed that the forestry station is doing good work, that the work is being very highly appreciated by the people of the country and that, as the result shows, very considerable progress is being made as the Premier has borne witness to in regard to the growth of trees. But, the greatest progress that is being made is not in the number of trees that has been grown but it is in the practical knowledge that has been acquired as to the growth of these trees and when the knowledge has become well-established

lished we hope to be able to extend our operations to a greater degree so as to produce wider and quicker results. That is the position in the West in regard to forestry. Here it is to some extent—to some extent may I say?—a question of argument, an academic question; there it is a question of the highest, the greatest and the deepest importance and everybody in the country understands it. Therefore, any result which may come from the deliberations of this Convention which will lead in any way towards increasing our knowledge of the means to preserve existing forests or create new, especially means which may be applied to the western country, will be more than welcomed by the Government, by the Department of the Interior, and by the Forestry Branch of that Department.

Mr. E. E. Joly de Lotbiniere, President of the Canadian Forestry Association gave a sketch of the history of the Association and its objects. Starting in 1900 the Association has now a membership of one thousand and has brought the forestry question to a prominent place in the estimation of the public.

MR. GIFFORD PINCHOT, chief of the Forest Service of the United States, was called upon and addressed the Convention as follows:—Before saying a word about the forestry on both sides of the line, I have the great honour and pleasure of bringing to His Excellency the Governor General and to you, Mr. Chairman, a personal message from the President of the United States (loud applause). I am to express to His Excellency the warmest personal regard of the President, and to you and to the members of this Convention his heartiest good wishes and good will and his confident and to me most welcome expectation of good to result to Canada from the work of this Convention. And I am to say to you that the President's own belief in the fundamental, vital and immediate importance of forestry grows stronger year by year (loud applause). For myself I may say that, so far as I know there has never been, at any time, or in any place, a warmer or more effective supporter of forestry than the President (applause). It is a very great satisfaction to me to know that he is threatened with a rival in Canada in your own person. (Laughter and applause.) I am the bearer also of a message from Hon. James Wilson, Secretary of Agriculture for the United States, and my honored chief, who has asked me to express to you his appreciation of the wisdom which called this Convention, and to express his good wishes for the permanent success of this work, and to tell you of the pleasure he has had in sending a representative to be present at your deliberations. (Applause.)

You have called this Convention in recognition of the vital importance of forestry to Canada. Forestry is more closely, and I think it fair to say, more tremendously involved in the

prosperity and well-being of the American continent north of the Mexican border than in that of any other area on the face of the earth. (Applause.)

Timber and water in the east, water and timber in the west, are the great products of this great beneficent cloak of forest which has been spread over so much of our land on both sides of the line. We are apt to consider it as simply a truism, when we say that forestry is important. Well, so it may be, but it is one of those truisms that must be made widely known. But, unless we can specify what forestry will do for us in Canada and in the United States, we may very well consider that we have failed in the presentation of our case. I like to think of the forest as giving us not merely protection for our water supply, not merely the guarantee of the productiveness of our soils, not merely the assurance of continuity of desirable local climatic conditions, but also as doing what it actually does—supplying us from day to day with material which is, perhaps, on the whole, the most important material for the building up of our civilization. We call this an age of steel, and so it is; but it is not the less an age of wood (applause). And one of the things with which we are face to face all over this North American Continent is the coming scarcity, in no long time, of this chief ingredient in construction, the pinch of the lack of which is going to be felt widely and keenly when it comes. And we must remember that when this want does come, it will not be a question merely of reopening the source of supply as we re-opened the mines when we were threatened with a coal famine a few years ago;—(applause)—It will be a question of feeling that want for years, fifty years being the shortest possible time within which the material can be grown. This is a matter in which foresight is the primal duty. Signs are not lacking all over this continent that the approaching timber famine is not very far away. I am informed that the prices of pine in Ontario have doubled within the past ten years; and similar facts might be cited from the pine and other timber producing areas of the continent.

Now, let us pass briefly in review some of the ways in which the forest contributes to the national well-being. You all know these things, nevertheless it will do no harm for us to keep them in mind, as I think we should do throughout this Convention. Though it is true that, in the eastern part of Canada and the United States in the past, the farmer was obliged to clear away the forest before it was possible for him to build his house or support his family, it is also true that that time has almost wholly past. We have now reached the point where the forest, instead of being the enemy of the farmer in the east, is his most potent friend. And, so far as the west is concerned we have reached the point where



the farmer, without the forest nearby either on his own farm or within distance of reasonable railroad transportation, absolutely cannot prosecute his industry. (Applause.) We have reached the point where agriculture depends directly and immediately on the preservation of our forests. Just across the line, in Michigan, we have a most terrible example of the expense and loss and lack of productiveness the destruction of the forest on non-agricultural lands brings to pass. We may assume, then, that the fundamental industry of your great country and my great country is absolutely impossible in the absence of forest preservation. Now, the same thing is literally true of mining. We may say that when wood is gone as fuel we will burn coal. But it is obvious, on a moment's consideration, that we cannot get the coal in the absence of the forest, because mining is impossible without vast supplies of timber. Even steel, on which this age is said to be based, could not be won from the ground unless the forest gave the means to do it. Nor can steel replace the wood—in this sense, that the larger the amount of iron and steel used in construction the more iron and steel replace wood in steamboats, railroad cars and buildings, so much the larger is the total quantity of wood used in construction of that kind. The total consumption of wood keeps pace with the increase in the use of substitutes. We cannot build railroads, nor maintain them, without the forest. We figure that, if a tree were growing at the end of every railroad tie in every railroad in the United States, we should be able barely to keep these ties sound in the track, making no allowance for any increase in mileage, which increase is going on so rapidly. The annual consumption of ties on steam and electric railroads in the United States closely approaches 150,000,000 per annum, an enormous sum, the contribution of the forest to transportation and without which transportation would be impossible. The average citizen, the merchant, or call him by whatever name his profession requires depends in his daily life at every point on the timber supply. And I repeat it, for it stands to me in a vital place in the consideration of this whole matter, that wood is just as necessary to us in this day as a material base for our civilization as any other material; and if we are to preserve our prosperity, if we are to grow—and growth is the one thing that every citizen of Canada and of the United States looks forward to for his country—we must preserve our forests. That stands in the first place (applause).

Now, we on our side of the line have taken up this question, too late it is true—far too late, But we have been enabled by the greater number of our population for the time being to go ahead somewhat more rapidly than you have been able to do. Until a recent time you have been occupied with the actual subduing of the country, the vast heritage, that lies before you.





Lumbering Road on J. R. Booth's Limit, Madawaska, Ontario



A Shantyman's Lunch in the Bush

I think I might with your permission, say just a word concerning the fundamental principles upon which the forest service of the United States is doing its work.

The first of these is that all permanence in forestry in any country with political institutions such as those of the English-speaking race must be based upon education (loud applause). We are making it our most fundamental effort in the direction of having every man, woman and child in the United States understand that forestry means something to every home (renewed applause) that this is not an academic question, but a matter that appeals directly to every man living in North America at this time. This is the basis (applause). We are going into the schools. We are going to see to it—and this may be called a prophecy merely—that every school child, every boy and girl who passes from the primary into a high school shall know what forestry means; that in every university something shall be taught of forestry as a branch of general culture, not as a profession, but simply as one of the things that every educated man ought to know about (hear, hear). Then, we are trying to establish object lessons in forestry by cooperation with private owners, because, with us the great body of our forests are in the hands of private owners. We hope, by these object lessons to show to every man who cares to see that forestry is a practical thing, that it is not a theory, not merely something to talk about, but something that may be carried out in the forest with a profit. And in this we have been so successful that the great organization of lumbermen in the United States, the Lumber Manufacturers' Association has emphasized its belief in actual forestry recently by appointing a committee to raise an endowment of \$150,000 for a chair of lumbering in the Yale Forest School (loud applause). They do it, of course, because they believe that they themselves will need foresters and because they feel that they must have men who know something about lumbering.

Now, as to the use of the public lands for forests. We base our whole policy on a principle stated by the President that we must put every bit of land to its best use, no matter what that may be—put it to the use that will make it contribute most to the general welfare. And we add to that that every acre of land which will contribute more to the public welfare by being maintained in forest, so far as we have that acre as a part of the public lands now, shall remain in public ownership. (Applause.) That means that we set aside, as rapidly as we can, and as our first duty, forest reserves wherever there are to be timbered lands in the United States.

We have already some 100,000,000 acres of these reserved, an area, unfortunately not one quarter large enough. But we took up this work after the greater part of the best timbered



lands in certain regions in the United States had passed under private ownership. You have been wise enough to keep the title in the State, and your opportunity of making forest preserves are better than ours have been hitherto. I might cite the instance of the State of New York, which you Mr. Chairman, have mentioned in order to point this moral. A former Governor of New York, Mr. Seymour, who was in office at the time when the forest lands of the Adirondacks had small value, looked far ahead and suggested that these lands should be reserved for State forests. He was laughed at, and nothing was done about it; the State parted with its title for a mere pittance. Since that time the legislative descendants of the men who refused to listen to Governor Seymour have paid—I do not know the exact sum, but it is not less than \$3,000,000 or \$4,000,000 to buy back the lands that might have been kept in full public ownership without any expense whatever (loud applause). And we in the United States will have to spend millions upon millions—we may begin with this session of Congress; I hope so—merely to buy back the land that we ought to have kept when we had the chance and the keeping of which would have involved no public expense. We are setting aside forest reserves and treating them as forest reserves as separate from the rest of the public lands. In carrying out this policy these forest reserves have been taken from the management of the General Land Office, which look after the public lands generally, but which is mainly a department to dispose of public lands, and put in the charge of the department of agriculture, to be used for purposes of production. We are using every possible resource of this forest reserve, timber, water, grass, mines and every other. Nothing in the forest reserve is exempted from use, but nothing is open to use that will keep the reserve from being permanent with the exception of the mines. We are going to see to it that those forest reserves continue not only through the years but through the centuries to make their contribution to the wealth of the country. And that is a perfectly feasible and practical thing to do.

Then, we are cooperating in the closest and most cordial way possible with the men who use the forest reserves. Forestry is a matter that, as a permanent policy can only rest on good will. One man can set more fires, if he chooses his time rightly, than ten times the number of men in this room can put out. We see clearly that we can protect our forests, protect our reserves, only if we have the good will of the people who live in the neighbourhood; and we are doing our best to secure that good will by treating the people fairly, and by making them pay the market price for whatever we give them. That does not seem, perhaps, to be the best way to secure the good will of these users; but we find that the men who use the reserves be-



gin to have much more respect for the officers who administer them and for the reserves themselves, if we are successful in doing with the reserve what any private owner would do with his own land. (Applause.) We see no reason why all the people as a body, should receive less from their reserves for the privileges which they give in them than would be the case if the whole of it went to a single man. And we are proving successful in securing market prices, and, I think, to a very considerable degree, conciliating the people in the neighbourhood. While, a few years ago, there was almost universal opposition to the forest reserves in the West, to-day organized opposition has disappeared and I believe that the policy which once would have been unanimously disapproved would now be almost unanimously supported if it could be put to the vote of the people in the region where our forest reserves lie.

One thing more: We are making a vigorous attempt to have the reserves handled from the point of view of technical forestry. We regard forestry as a profession, as much as engineering, law or medicine, and we are doing our best to see to it that the men who carry on the work of these forestry preserves shall be men trained to the service, either in the Government service or in the forestry schools—professionally trained men with a technical outfit which will entitle them to recognition, on the same plane, for instance, as a highly trained engineer. Resting on the foundation of this body of trained men, whose profession is forestry and who propose to do that and nothing else all their lives, we are trying to build up a special force that shall have an *esprit de corps*, a force continuing year after year, a force that can be sifted and sifted as the years go on, until we shall have the very best collection of individuals that there is anywhere in the Government service. For, it is one happy thing about forestry that you can get a better man to work for less money in the woods than at any other piece of work I know anything about. (Applause and laughter.)

Now, I have run over this matter very briefly and rapidly, and I have just one word to say in conclusion. Forestry with us is a business proposition. We do not in our hearts love the trees any less because we do not talk about our love for them. But you will never get the owners of a forest land to keep them in forest for merely sentimental reasons; that has been tried and it does not work. But the thing you can do, and the thing we are doing on a large scale in the United States is this:—If you can show these owners that it is worth while to practise forestry, that forest lands can be cut over, and if the methods suggested by a true system of forestry are followed the lands will be worth more than before you convince them that forestry is worth something.

And finally the end and aim of all this work is a very definite

one. I have said a hundred times that I have no interest in a forest that is not of use for something. If our forests are simply to stand there and all we get out of them is the knowledge that we have them, then, so far as I am concerned they disappear—I care nothing about them whatever. But the great aim and object of this whole movement as the President has stated over and over again is the making and the maintenance of prosperous homes. Our forest reserves are part of the great equipment of our country for the good of its citizens; and, just so far as we use these forests to promote family life, to make prosperity for the people—in fact to make and maintain prosperous homes—just so far shall we think ourselves successful. (Loud applause.)

### AFTERNOON SESSION.

WEDNESDAY, 10TH JANUARY.

At this session the first paper on "Dominion Forestry" was read by Mr. E. Stewart, Dominion Superintendent of Forestry. It is reproduced elsewhere.

Dr. Robert Bell, Acting Director of the Geological Survey, followed with a paper on "Forest Fires." The northern forest area, as defined by Dr. Bell covers a tract nearly 4,000 miles in length, by from 500 to 800 miles in width. There have been great forest fires in this region and the areas so denuded have been marked out by the Geological Survey. Looking over this country from a high hill, it presents a patchwork of different colors, according to the age of the different parts of the forest. There is the light green of the poplar and birch contrasted with the dark green of the coniferous forest. Most of the fires in the north are caused by lightning, but human agency is responsible for its share. The white men are careless and have taught the Indians to be the same. These fires sometimes cover tens of millions of acres, and the forests burned are of the value of hundreds, if not thousands of millions of dollars. Surely it is most important for the Government to take any reasonable means to prevent this destruction and loss. What we need to do is to give the forest a chance to grow. Dr. Bell exhibited a map showing the forest areas referred to, on which were indicated the burned-over and the still forested tracts.

C. H. Keefer, C.E., representing the Society of Civil Engineers, read a paper on "The Effect of the Conservation of the Forests of Canada on the Water Powers." After reciting the various factors that entered into the question, Mr. Keefer stated in conclusion, that the effect of the conservation of the forests on the water powers is most beneficial, and its importance cannot be overestimated. While the influence of forest covers on rainfall

is problematical, there can be no doubt of its direct influence in the regulation of flow and prevention of extreme floods, including loss, damage and waste of water power. The water powers of our country are second to none, their importance in view of the developments that have been made in the transmission of electric power is far reaching and this, with the great saving in cost of electric power over power generated by steam, should, with our enormous natural resources, place Canada in time in the front rank as a manufacturing and exporting country.

Mr. Thos. Southworth, formerly Director of Forestry for Ontario, submitted a paper on "Forest Reserves and their Management." After sketching the history of the forest reserves, which in Ontario are set apart on legislative authority, Mr. Southworth estimated the area that should be kept permanently in timber at forty million acres, which at a return of 150 feet, or 75c. to the acre, would mean a revenue of \$30,000,000 per year. To achieve this result, something more than harvesting the most valuable sorts of trees in the most economical way is required. That system is converting Algonquin Park from a mixed pine and hardwood forest to a hardwood one. Working plans must be laid down covering a hundred years or more, plans that will provide for harvesting the present crop of various sorts of trees in such a manner as to secure the after growth of the right kind of trees and to regulate the cutting so as to secure evenness of supplies and of revenue.

Mr. M. J. Butler, Deputy Minister of Railways and Canals quoted from the Railway Gazette the instructions to drivers of railway locomotives, requiring care in keeping equipment in repair so that the escape of sparks may be prevented. The leading railways are using engines with extension fronts and screens with a quarter-inch mesh, and compound engines, with a softer exhaust, are being introduced.

Mr. E. G. Joly de Lotbiniere, suggested as an additional precaution, that it would be well to have a patrol along the line of railway.

Mr. Aubrey White, Deputy Commissioner of Lands and Mines for Ontario, outlined the system on which the forest protection service of Ontario is organized, and urged the necessity of protecting the forest we now possess. In connection with the building of railroads, the Canada Atlantic and the Temiscaming railways were instanced as examples of what could be done in the construction of such roads without destroying the forest by fire. Mr. White made a strong declaration in favor of reserving for timber production lands that are unfit for settlement.

Dr. B. E. Fernow pointed to the government as the great sinner in connection with the administration of the forests, and



urged a reconsideration of its policy in the granting of timber lands. Emphasizing the public interest in the forest, Dr. Fernow gave as an illustration the fact that in Germany the forests under government management, being nearly one-third, are in the best condition. The governments that are now spending money in protecting limits and improving limits, in building roads and railroads and preparing the property for effective management, are the governments that will earliest reap the benefit.

Mr. Jas. Leamy, Dominion Crown Timber Agent at New Westminster, described the fire protection organization carried on on Dominion Lands in British Columbia.

Dr. C. A. Schenck, of Biltmore, N.C., laid down as the three planks of a Canadian forestry policy; first, that the Dominion and the provinces should retain in the hands of the Government, in fee simple, all exclusively forest land; second, the protection of the forests from fire, and third, that the forest must be made a paying investment, whether the individual or the Government is the owner of the forest.

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## EVENING SESSION

WEDNESDAY, 10TH JANUARY.

At the Evening Session, Hon. Sydney Fisher, Minister of Agriculture, gave an address on "The Forest and the Water Supply," speaking particularly of the so-called semi-arid district in Southern Alberta, which depends largely on irrigation for its fertility. Stretching away eastward from the lower hills of the Rocky Mountains south of the C. P. R. we have a slowly descending plain descending eastwards and northwards with a very considerable fall all the way from the mountains to about Regina. Over that area generally water is scarce, so scarce that in many parts of it, without irrigation, successful cultivation is supposed to be impossible. I do not like to say myself positively that successful cultivation is impossible anywhere, because in the development of our Northwest especially, and in the development that has taken place in many ways all over Canada we are constantly, from year to year—I might almost say from month to month—discovering new possibilities in the development of our country which our fathers, and even people who have settled as recently as ten years ago, thought to be quite impossible. Therefore, I guard myself very carefully when I suggest that over a portion of that area, at all events, there is doubt about the successful cultivation of ordinary field crops. We must then look for some assistance to the ordinary climatic conditions for the cultivation of field crops, because that is the area of our country to which the whole world—not only Canada, but the British Empire and I might say the whole world—is looking for its future wheat supply. And it behooves us, therefore, to see what we can



do to make the production of wheat and other field crops there assured year in and year out without reference to what may be a particular season's climate. We are fortunate in many ways in looking forward to this. Just to the west of the area I have described, we have the eastern slopes of the Rocky Mountains. The eastern slopes of the Rocky Mountains are clothed at the present time almost entirely with a forest growth, a forest growth which, perhaps some lumbermen might not consider of the greatest value, a forest growth which does not compare with the growth of the forests in British Columbia and does not compare with the growth of the forest in the old days in this Ottawa valley, but still a very considerable forest growth, a forest growth which, at any rate, is quite sufficient to conserve and keep permanently conserved all the water supply which flows down through the streams on the eastern slopes of the Rocky Mountains most of which water eventually finds its way into the Saskatchewan River. Up to the present time, I do not think that any material inroads have been made into that forest growth, but I venture to predict, unless the greatest care is exercised to preserve it in the near future, the moisture of our plains will be considerably sacrificed and the mighty rivers which to-day come out of those hills and course through that prairie region will be turned, in the spring-time into floods and in the summer-time into dry water-courses. These great rivers and streams have cut deep courses through the fertile prairie, and as a general rule, the water-course itself is considerably sunk below the general prairie level. The farther and farther you go from the hills, the deeper and deeper becomes the valley in which the river runs. Fortunately, the general descent of the whole plain is so great that it is not a very difficult task to take the water out from the upper reaches of these rivers and by carrying it along on the upper levels over the prairie and keeping it within bounds we are able to distribute it over large areas of that country through irrigation, securing and ensuring the future development and cropping of the country. I believe that this is one of the most important pieces of work which the Government and people of this country must look to and see in the future.

A paper on "Forestry and Irrigation," prepared by Mr. J. S. Dennis, Commissioner of Irrigation for the Canadian Pacific Railway Company, was read by Mr. Pearce. Mr. Dennis pointed out the great value of the irrigation works in Southern Alberta, amounting to \$3,500,000, and the necessity for preserving the forests on the watersheds of the eastern slope of the Rocky Mountains in order to preserve the water supply.

"Water Powers" was the subject of a paper by Cecil B. Smith, C.E., Chairman of the Temiskaming Railway Commission, which is reproduced farther on.

Mr. E. G. Joly de Lotbiniere, read a paper prepared by Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, giving a description of the different species of trees found in that province and the uses to which they are put.

Views of a number of scenes showing tree growth and different stages of forest destruction were shown.

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## MORNING SESSION

THURSDAY, 11TH JANUARY.

The first paper read was, "Forestry on the Experimental Farms" by Dr. Saunders, the Director of Experimental Farms. It was stated that the total number of trees distributed among the settlers in the Canadian North-west since 1889 was about two millions, and the quantity of tree seeds about ten and one-half tons. As each pound of this tree seed with reasonable care might be expected to produce five hundred to eight hundred seedlings, it was not surprising that the results of this work were everywhere apparent. As to tree planting at the experimental farms, the fact was noted that while the pine planted in 1889 was now 25 feet high and measured  $9\frac{1}{2}$  inches in diameter of trunk  $4\frac{1}{2}$  feet from the ground, a white spruce planted in 1890 was now 32 feet high and measured  $5\frac{3}{4}$  inches in diameter of trunk  $4\frac{1}{2}$  feet from ground. The results of tree planting in British Columbia were given, showing that some hardwood trees of the east could there be raised and with more rapid growth than was the case here.

This was followed by a paper on "Farm Forestry in the Eastern Provinces," by Revd. A. E. Burke, of Alberton, P.E.I., which is given elsewhere.

"Tree Planting in the West" formed the subject of a paper by Mr. Norman M. Ross, Assistant Superintendent of Forestry of Canada. He said that by next spring 7,347,000 seedlings and cuttings would have been sent out, and they knew from actual inspection that 85 per cent. of these trees were growing.

E. J. Zavitz, Lecturer on Forestry at the Ontario Agricultural College, discussed the "Agricultural College Problem." The recklessness with which the pioneers of Ontario destroyed the forest was referred to, and surprise was expressed at the lack of knowledge in these days as to the value of certain trees. Last summer Mr. Zavitz found a farmer turning the last remnant of his woodlot into cordwood, and among other valuable trees were some black cherry trees from 15 to 18 inches in diameter. The valuable woods native to Ontario were disappearing and were being imported by manufacturers. We were now only using the poorer quality where once only the first grades would have been looked at. In 1884 a Toronto firm offered \$18 to \$20 per thou-

sand for white oak loaded on car at the point of shipment. To-day white oak was selling at \$30 per thousand on the stump. Mr. Zavitz urged that settlers should be debarred from entering lands which were only fit for forestry. The policy and method of cultivating trees in wet lands of old Ontario would be a splendid object-lesson.

Hon. A. A. C. LaRiviere, representing the Government of the Province of Manitoba, expressed the great interest of that province in forestry, and stated that the government was now establishing an agricultural college on a large scale, which would afford means of education in tree culture and forestry.

Mr. J. D. Allan, President of the Toronto Board of Trade, stated that the report that would be carried back to the Board by the delegates it had sent was that the forest is one of the most important assets we have in this country, and that it must receive greater attention at our hands than it has in the past. Mr. Allan gave an interesting sketch of what he had seen of forest administration in Russia and Scotland.

Hon. Mr. Tessier, Minister of Agriculture, conveyed greetings from the Province of Quebec, and President G. C. Creelman, of the Ontario Agricultural College, and Mr. A. P. Stevenson, of Virden, Man., also took part in the discussion.

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## AFTERNOON SESSION

THURSDAY, 11TH JANUARY.

Hon. W. C. Edwards, President of the Quebec Limit Holders' Association, called attention to the great importance of the forests for their beauty, for their influence on the water supply and on agriculture. Speaking of the statement sometimes made that the forests of Canada are inexhaustible, or on the other hand, that they have all been destroyed, he took the medium position, and thought that a great deal could be done to preserve the forests. The chief agents of destruction have been forest fires, railways and illegitimate settlement. The all-important matter is to keep fire out of the forests, next to have proper government regulations, and next there must be careful cutting on the part of the lumbermen. In so far as the cutting of timber is concerned, my system would be that every mill owner should build his mill in proportion to the growth of his limits and cut annually the growth. If that is done, and fires kept out, the limits of Canada will never disappear.

As to the question of growth and the possibility of restoring the forest, my observation is that the growth varies very much in various districts, that in some places growth is very slow and in



some places very rapid. I think that perhaps this northern portion of the Ottawa region, and the portion from the Gatineau westward, is the most rapid growing pine district we have in this portion of Canada. In that region, it is my belief, that if the pine is carefully cut it will never be exhausted. I think that to deal intelligently with this subject and to be able to make the very best suggestions as to how the forest may be perpetuated one would need to know what is being done in other countries. I am well acquainted with some Norwegian lumbermen who tell me that their forests will never be exhausted. There they never replant; they just depend on natural reforestation, which, I think, is all that is necessary here. I do not think that replanting is necessary, although I think that in many instances, and in many localities, it might be desirable.

If I might be permitted to offer a suggestion in that regard this would be my plan for a forestry school. I would set aside, say a thousand square miles, or 500 square miles, and on that I would establish a school of forestry. I would invite young men to come to that school to learn both theoretical and practical forestry right on the limits. I would then have an estimate made to ascertain as nearly as possible what, in a few years, has been the growth of timber on these limits. I would have these young men go round each year and mark the trees that can be cut. I would make them cut the timber, haul it and saw it. I would make every one of these young men into a first class forester and a first class lumberman, and these young men in time would become the lumbermen of Canada. That, in my opinion, would be the greatest step in advance in so far as the cutting of the forest in an intelligent way is concerned that could be desired.

I believe the day will come when the Province of Quebec, portions of Ontario and other portions of the country that I am not so familiar with, will be the manufacturing centres of the North American continent. How are we going to preserve these conditions? Denude the forests and you will not have these conditions; maintain the forests and you will have them. If a premium is offered to the people of the Province of Quebec to maintain their forests, unbroken, and to maintain the water supply which they have—the greatest inheritance that any people could have, in so far as power and manufacturing is concerned—that province, although its finances may perhaps be a little at fault to-day, will some day be the manufacturing centre of the continent.

Mr. J. B. Miller, President of the Ontario Lumbermen's Association, presented a paper on "Forestry from the Lumberman's Standpoint." He spoke of the difficulties in the way of the lumbermen, owing to the withdrawal of lands for settlement that was not permanent, and also to the work of the operators



in hemlock bark. For the older districts he suggested the establishment of a rule that there must be at least sixty per cent of arable land on all lots applied for, and then only where there are other lands in the same locality which are fit for settlement. The offering of small berths, and for limited periods, and the granting of pulp and pine concessions over the same areas had hastened the destruction of the timber. Mr. Miller's whole argument was for the permanent holding of forest lands and replanting where necessary.

Mr. William Little, of Westmount, Que., took up the question of the lumber industry and its relation to the forest. In the last six years prices had risen 10 per cent in the eastern part of Canada. There was a great loss in the way lumber industry was carried on. So far, vast areas of timber had been sold by governments to people for a mere trifle of their value. He knew of a man who boasted that he bought a timber limit for \$20,000 from which he cut \$200,000 worth of timber and sold it for \$750,000. The selling of timber limits at a sacrifice was a common mistake of all the governments. Instead of Canada making money by lumbering, it made money by not lumbering. It was deplorable to look upon the immense losses caused by the sacrifice in timber sales. Mr. Little dealt in scathing terms with the lumbermen who went into the woods and chopped down valuable trees which were too small to make lumber.

"Forest and Lumbering in Nova Scotia," was the subject of a paper by F. C. Whitman, President of the Western Nova Scotia Lumbermen's Association. He said that in the past, forestry in Nova Scotia has not been given much thought. The government of the province was too lenient in disposing of the timber lands and should have kept control instead of making absolute grants. The cutting of the best timber and fire have depleted lands that to-day should be valuable; and they might be made so by reforestation. At present, there are signs of a greater interest being taken by the Government of Nova Scotia and by lumber firms in forestry. The timber owners feel more assured under the present Act of "Protection of woods against fires" of their holdings being protected, and more inclined to conserve their cuttings and let the smaller growth reach maturity. The future gives promise of attention being paid to forest values, more conservative cutting, and with natural reproduction and protection there is every reason to believe that forest wealth will continue to be one of the most important assets of the Province of Nova Scotia. There is still to be solved the best method of reforesting in Nova Scotia, the kind of trees to plant and who will undertake the work. It would appear to be a proposition that the Government should take up, and as they own 1,500,000 acres there is ample area on which to begin such a work, and there is no doubt the

Government could again acquire title to a large number of old grants and cleared holdings of private parties at a nominal sum per acre. A practical forester by going carefully over the situation could no doubt give valuable information and probably formulate a scheme that would work out successfully and be beneficial to the lumbermen and to the Province of Nova Scotia.

Mr. C. M. Beecher, representing the Lumbermen's Association of British Columbia, stated that on the coast the question of reforestation or tree planting was not of economic interest for the moment as the timber area is large and covered with a good stand. When lands have been logged or burnt over and nature has been allowed to work there has been a natural resowing, and the same trees are growing up in the forest again, namely: Douglas fir, spruce, cedar and hemlock. If it is a mere question of trees, our forests are inexhaustible, but if it is a question of merchantable timber, I regret to say that as far as our information goes now, the timber resources of British Columbia are limited. The lumber manufacturers are forced to take from their limits a small percentage of the trees and are able to ship only selected lumber. The burning question with the lumber mills of British Columbia to-day is the question of market and extending the outlet for the product of the manufacturers. Mr. Beecher spoke of the advantage that would be derived from a preferential trade arrangement within the British Empire, and asked that in government contracts specifications should call for Canadian timber.

Speaking of fire protection, he praised the work done by the Dominion Government in the Railway belt, and read a letter from Mr. O. C. Buchanan, President of the Associated Boards of Trade of Eastern British Columbia, strongly favoring action on the part of the Provincial Government to prevent forest fires.

Mr. H. M. Price, President of the Province of Quebec Pulpwood Association, in a paper on "The Pulpwood Industry" stated that a smaller diameter of wood had been cut than it was in the true interests of the pulp and paper mills to accept, or the owner of private lands to cut. Some twelve years ago the diameter shipped was six inches and up, while now four inches and up is accepted. Mr. Price believed that the cutting of trees for pulpwood under seven inches in diameter at the stump, and the shipment of wood under five inches in diameter should be discontinued.

Mr. J. F. Ellis, of Toronto, and Mr. Ferdinand van Bruyssel discussed the subject at the conclusion.

## THURSDAY EVENING

11TH JANUARY.

A Banquet was held at the Russell House, which was presided over by the Premier of the Dominion. After the toast to His Majesty the King, followed that to His Excellency the Governor General, which was pleasantly responded to.

"The Forest Interests of Canada" were replied to by Hon. W. C. Edwards and Hon. F. J. Sweeney, Surveyor General of New Brunswick.

"The Allied Interests" brought responses from Mr. B. E. Walker, General Manager of the Bank of Commerce and Mr. J. D. Allan, President of the Toronto Board of Trade.

The toast of "Our Guests" was proposed by Sir Wilfrid Laurier in a felicitous speech and was responded to by Mr. Gifford Pinchot, Dr. B. E. Fernow and Dr. C. A. Schenck.

"The Press" was responded to by Mr. J. F. Mackay, Business Manager of the Toronto Globe.

Over two hundred were in attendance and the banquet was a great success.

## FRIDAY MORNING

12TH JANUARY.

Mr. Joseph Hobson, Chief Engineer of the Grand Trunk Railway and Mr. L. O. Armstrong, Colonization Agent of the Canadian Pacific Railway gave interesting papers showing the railway requirements for timber. The Grand Trunk requires 95,000,000 feet annually, and the Canadian Pacific 244,000,000 feet. These papers contained a great deal of interesting material which space forbids us to reproduce at present.

"The Pulp Industry of Canada" found an exponent in Mr. E. B. Biggar, Editor of the Pulp and Paper Magazine. The first part of the paper briefly reviewed the history of pulp and paper manufacturing, which had its inception at St. Andrew's in Quebec, in 1803. The first paper mill in Upper Canada was erected at Ancaster in 1820. In 1888 there were 34 pulp mills with a total capacity of 154 tons every twenty-four hours. Last year the number had grown to fifty-six mills, with a capacity of 2,470 tons. There were in 1888, 40 paper mills with a capacity of 173 tons per twenty-four hours. Last year the number of mills was 38, and the daily capacity 854 tons. It would, therefore, be seen that the capacity of the Canadian pulp mills had more than doubled, and the capacity of the paper mills increased still more the last six years. There are now in course of construc-

tion six pulp mills with a capacity of 630 tons, and eight paper mills with a total daily capacity of 375 tons. These mills manufacture all grades of wood pulp, and most varieties of paper. They not only supply the bulk of the home market on certain lines, but of recent years have developed an export trade.

Canada has the greatest area in the world of forest suitable for the manufacture of pulp, her spruce lands alone being estimated at 450,000,000 acres.

Mr. J. F. Mackay, Business Manager of the *Toronto Globe*, in a paper on "The Newspaper Publisher's Interest in Forestry," made a strong presentation of the interest of the newspapers in the forests from which their raw material was drawn.

"The Forest and the Mine," by Frederick Keffer, Manager of the British Columbia Copper Company, Greenwood, B.C., and "The Wood Supply of the Manufacturer," by J. Kerr Osborne, Vice-President of the Massey-Harris Company, gave a presentation of the needs of these two industries.

Dr. J. T. Rothrock, Forest Commissioner for the State of Pennsylvania, said that in his lifetime he had seen one-sixth of the area of the State of Pennsylvania pass from a productive to a non-productive condition. It was not necessary to go to the old land, nor to any part of the old world, to find the desert which has been made by the removal of the forests. I can take you to the hill-sides of Pennsylvania and show you exactly that condition—and that in a State not two centuries old. Dr. Rothrock told of the assistance given by the ladies to the forestry movement in Pennsylvania, and urged that in Canada their aid should also be secured.

Mr. Jas. Beveridge, Manager of the Mirimachi Pulp & Paper Company, stated that the annual cut for his business was 14,000,000 feet, and that if the government would hand over to him 23,000 acres of land, he would cultivate all the trees he wanted for his factory, pay out \$175,000 a year in wages and put down plant worth \$750,000.

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## AFTERNOON SESSION

FRIDAY, 12TH JANUARY.

Monsignor J. U. K. Laflamme, of Laval University, read an excellent paper on "Forestry Education." He stated that the Province of Quebec had sent two young men to the Yale Forest School and they would be given an opportunity to complete their forestry education in Europe. This would be the nucleus for a Forest School. It was urged that every effort should be made by the distribution of bulletins in English and French, through the



newspapers, and through the schools, to educate the people to the importance of the question.

Details were given of the good results obtained at Oka, through the efforts of M. l'Abbe J. D. Lefebvre, Cure of Oka, in the planting of sand hills with pine, spruce and other trees, with the outcome that the sand dunes are fixed and are bearing a valuable forest.

Dr. Judson F. Clark followed with a paper which will be found in full farther on.

Mr. B. E Walker, General Manager of the Bank of Commerce, called attention to the educational value of the Convention, and in connection with the question of forestry education stated that as a member of the Ontario University Commission his personal opinion was in favor of providing for a chair of forestry in the Provincial University.

The discussion was continued by Dr. Jas. Fletcher, Professor Penhallow, of McGill University, Professor Montgomery, of Trinity University and Revd. Thos. H. Boyd.

The following resolutions were submitted by the Committee on Resolutions and passed:—

1. RESOLVED, that the time is now ripe for a general forest policy for Canada, and that the federal government be asked to inaugurate the same.

2. RESOLVED, that this Convention would urge the importance of the exploration of the public domain in advance of settlement with the object of determining the character of the lands so that settlement may be directed to those districts suitable for agriculture and which give promise of the possibility of the establishment of permanent and prosperous homes for the settlers, and that the lands unsuited for agriculture should be withdrawn from settlement and permanently reserved for the production of timber;

That this Convention approves of the policy of Forest Reserves adopted by the Dominion and Provincial authorities and favors the extension of such reserves, as may be found practicable from time to time, so as to eventually embrace all lands suited only for the production of timber;

That in the administration of such reserves this Convention would approve of the policy of having the cutting done under the supervision of properly qualified officers, and that in such operations due provision should be made to ensure the reproduction of the forest.

3. RESOLVED, that in view of the great saving of timber throughout the Dominion which has been accomplished by the fire ranging staffs organized under Dominion and Provincial authorities, this Convention desires to place on record its ap-

proval of the establishment of a fire ranging system for the protection of the forests, and to urge that this system be extended to all forested districts as far as possible, and that, in view of the great interests to be protected, the service under such a system should be made as complete and effective as possible. In this connection this Convention desires to call public attention to the small expenditure made for the protection of the timber resources of the country in proportion to their value when compared with rates of insurance paid on other public property.

4. RESOLVED, that in view of the many important respects in which the water supply affects the industries of the country, in particular agriculture, irrigation and manufacturing, and the increasing value of the water powers, owing to the adoption of electricity for industrial purposes, this Convention would urge that special means should be taken for the preservation of the forests on watersheds so as to conserve throughout the year the equable and constant flow of the streams dependent thereon;

That in view of the large expenditure made on irrigation works in Southern Alberta and the intimate relation of the flow of the irrigation streams to the forests of the eastern watersheds of the Rocky Mountains, this Convention would specially urge upon the Government of the Dominion the necessity for the protection of the forests on this watershed;

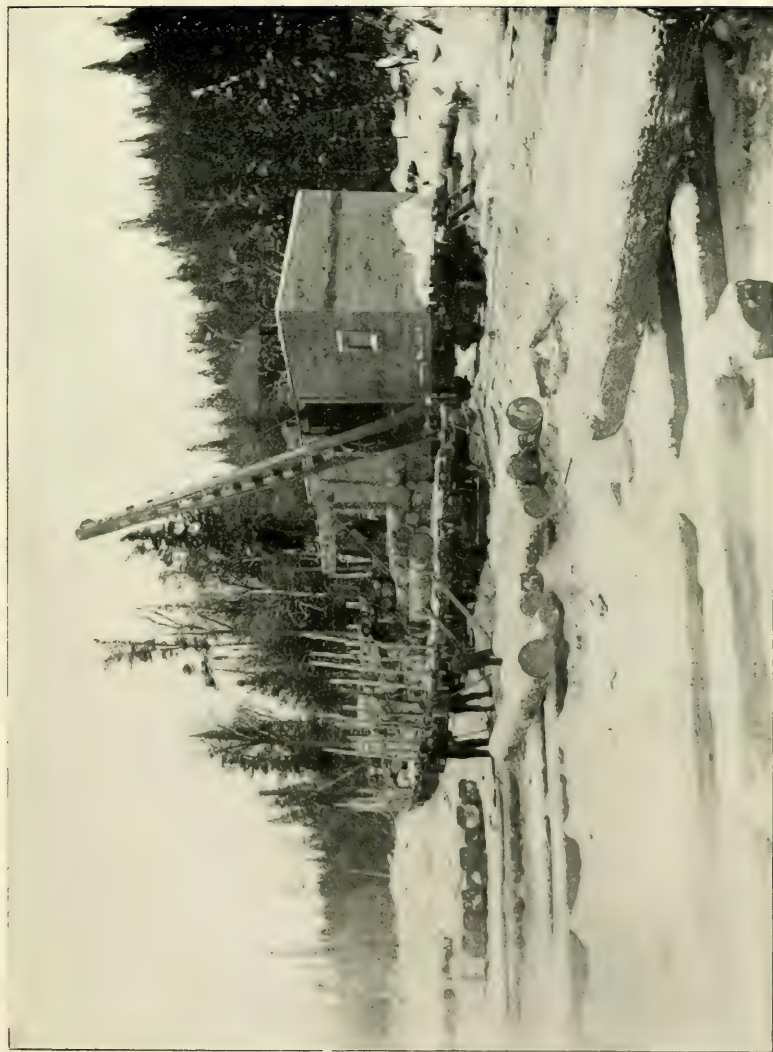
5. WHEREAS in the older settled districts of Canada conditions are now such that great benefits would be derived by the country as a whole from some systematic movement to re-afforest large tracts of land which at present are lying waste in the agricultural districts: and

WHEREAS farmers, as a rule, have no expert knowledge as to the cultivation of trees and find it almost impossible to obtain nursery stock of forest trees at reasonable prices and of good quality for planting purposes: and

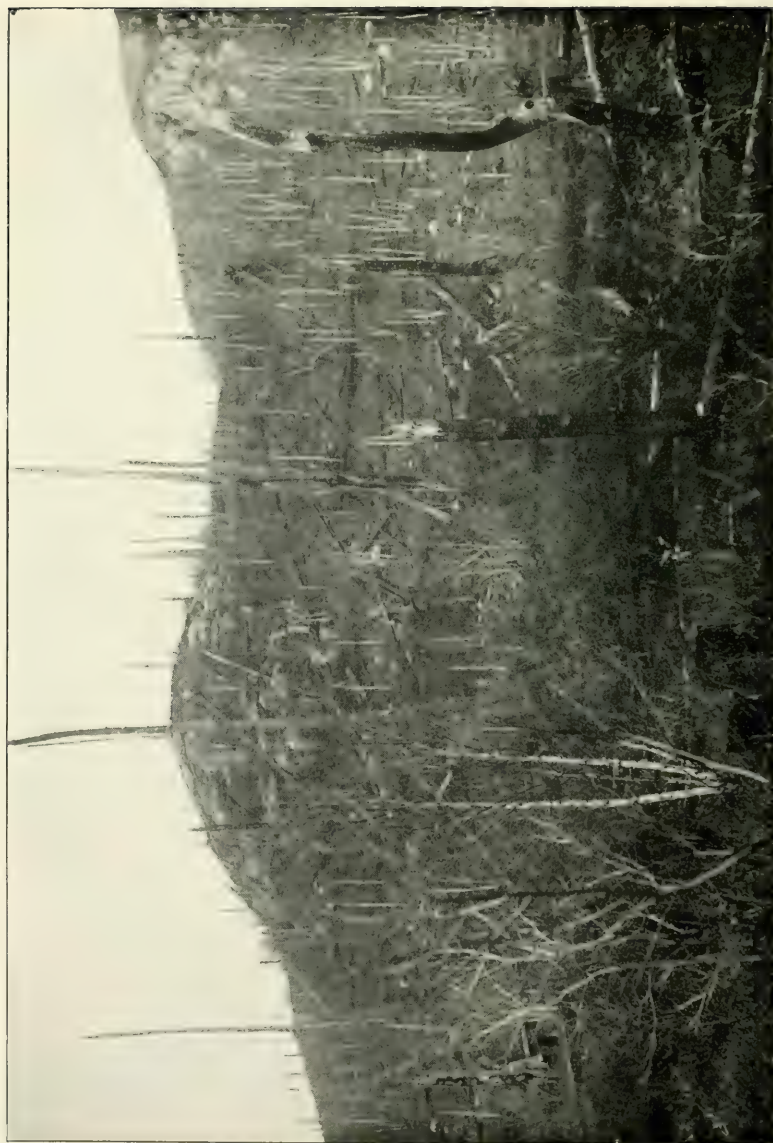
WHEREAS the farmers of the country are, if properly informed, the right class of people to undertake tree planting in the agricultural districts: and

WHEREAS the scheme at present in operation in the West, carried on under the Dominion Government, which provides for the free distribution of forest tree seedlings and instruction as to their cultivation, has given satisfactory results:

THEREFORE RESOLVED, that this Convention would urge the governments, both federal and provincial, to take steps to encourage, as far as possible, both by instruction and by giving facilities for obtaining nursery stock suitable for afforestation, a more general interest in tree planting, especially on such lands as are at present unfit for ordinary agricultural purposes, and we would further urge the Dominion Government to make,



Loading Logs at Madawaska, Ontario



A Burnt Over Tract near Madawaska, Ontario



if possible, further efforts in this direction in the prairie regions where the results from tree planting are bound to be of inestimable value to the whole country.

6. RESOLVED, that especially in view of the proposed construction of a new transcontinental railway and the projection of other lines passing largely through coniferous forests, the attention of the Governments of the Dominion and the provinces, and also of the railway companies, be called to the serious danger of loss of valuable timber consequent upon the construction and operation of lines so located, if all possible precautions to prevent the starting of fires are not taken; and that it be urged that the question be given full and careful consideration.

That to the end sought, the railway companies constructing such roads should be required to furnish an efficient equipment and control to prevent fires.

That at such seasons as may be necessary it be required that an effective patrol be established along the afforested line of railway, whether under construction or in actual operation.

And further, that the officers both of the governments and the railways, be required to use all possible diligence to prevent the starting or spread of fires through defective equipment or through the carelessness of the operations or negligence of the employees under their control.

7. WHEREAS, it has been the common method in lumbering over a large portion of the timber area of Canada to fell trees by the use of the axe:

And whereas, it has been found that trees sawn close to the ground can be felled more cheaply than those cut down with the axe, resulting in a gain of from six to ten per cent in the scale of the logs and diminishing the risk of fire caused by chips in felling:

And whereas, the felling of logs after the season of snow has resulted in a large loss to the forests of Canada:

Therefore resolved that this Convention recommend to those who are in control of the public lands of Canada the advisability of making such regulations as will carry out the principles of this resolution.

8. RESOLVED, that this Convention is of opinion that the retention of rough areas under wood and the replanting of areas unsuited for agriculture would be encouraged if some action in the direction of relieving the same from taxation could be put into effect by the local governments and the municipalities.

9. RESOLVED, that the Government be, and is hereby requested to place forest tree seeds imported for afforestation purposes on the free list.

The following resolution was read by Mr. J. Fraser Gregory, of St. John:—

We, representatives of Boards of Trade throughout the length and breadth of the Dominion, delegates to the Canadian Forestry Convention in session assembled:

Resolve, that we heartily approve the interest taken by our National Government and the Premier, Sir Wilfrid Laurier, in calling this Convention and the assurance we have that the preservation of the forest shall receive the great attention it requires and demands.

That we will report to our various Boards the valuable lessons we have learned, and have them each and all impress on their Provincial Governments the advisability of following the example set by the Federal Government in taking steps to protect, conserve and perpetuate their forests.

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On Saturday, through the kindness of the Grand Trunk Railway and Mr. J. R. Booth, a visit was paid to Mr. Booth's timber limit at Madawaska, where a pleasant time was spent and a shanty dinner was thoroughly enjoyed by all.

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The Annual Meeting of the Canadian Forestry Association will be held at Ottawa, on Thursday, the 8th March, 1906, in the offices of the Forestry Branch of the Department of the Interior. Only the election of officers and other necessary business will be dealt with, owing to its following so closely the Forestry Convention.

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An important announcement made at the Forestry Convention by the General Manager of the Bank of Commerce, Mr. B. E. Walker, was to the effect that all the managers on the staff of the Bank would be made members of the Canadian Forestry Association. This promise has been promptly fulfilled.

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The Canadian Forestry Convention has the honor of recently welcoming to its ranks His Grace Monsignor Bruchesi, Archbishop of Montreal, and His Grace Monsignor Begin, Archbishop of Quebec.

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Owing to the pressure of other business, it has been necessary for Mr. R. H. Campbell to retire from the editorship of the Forestry Journal. The next issue will, therefore, be under other editorial management.

## FORESTRY ON DOMINION LANDS.

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E. STEWART, DOMINION SUPERINTENDENT OF FORESTRY.

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If I know anything of the object of the convener of this great convention in calling you together it was to obtain the views of the people from all parts of the Dominion in order that good practical results might follow your deliberations. If we only meet and indulge in a pleasant academical discussion, without expressing some opinions of what should be done in a practical way, not only to preserve, but to propagate our great forests, this meeting will fall far short of its opportunities. The fact is, the matters inviting our attention in this connection are far more than academical; they are live issues that demand of the people of the country immediate action, and in the few minutes at my disposal I will ask your attention, first, to the extent of the forests under Dominion control; second, to what we are doing at present regarding them; third, what in my opinion should be done; and fourth, make but a very brief reference to afforestation on the plains.

When our north-western possessions are mentioned, the picture generally suggested is that of vast prairies stretching for hundreds of miles on every hand unrelieved by a single tree. Now while this is true of a very large extent of country it represents only a small part of the total land area owned and controlled by the Federal Government.

According to the census returns for 1901, the total *land* area under the control of the Dominion Government is 2,656,200 square miles. Of this, the bare prairie probably occupies 160,000,000 acres, or 250,000 square miles. The barren lands of the far north I have elsewhere estimated at four times that of the prairie, or 640,000,000 acres, or 1,000,000 square miles. These two would make 1,250,000 square miles of treeless land, and subtracting this from the total land area under federal control will give us 1,406,200 square miles, which is more or less wooded. The total land area owned by the provinces aggregates only 963,618 square miles, so that the Dominion timbered lands, according to this estimate, exceed the total land area, both timbered and cleared up of all the old provinces by 442,582 square miles.

But it may be truly said that on a very large proportion of this the forest growth is of little value for commercial purposes.

Let us make due allowance for this and estimate that only one-fifth of this land contains timber fit for such purposes. One-fifth of 1,406,200 gives 281,240 square miles.

We have now taken from the total land area under Dominion control the barren lands of the far north, and the prairie land, and then taken only one-fifth of the remainder in our estimate to represent the area of land containing merchantable timber: and we have still left 281,240 square miles. Suppose that the latter area contains only 2,000 feet, board measure, to the acre, or 1,230,000 feet to the square mile over ten inches at the stump, and we have left after all these reductions 359,987,200,000 feet of mature timber, which at the low rate of royalty to the Government of \$1.00 per thousand would be \$359,987,200, which sum represents but a small part of its value to the community and does not include the smaller growing timber which should be regarded as the agriculturist does his growing crop. It is true that much of this timber is not at present available, but it is a portion of the nation's inheritance and the Government as trustees of the state, are in duty bound to conserve it whether it is used by those now living or reserved for future generations.

This vast area represents Canada's woodlot. Let us save it while we may! The greater part of the timber is growing on land unsuited for agriculture, either from its high altitude or high latitude. We have in that great region, which is well described as our subarctic forest belt, a vast tract of such land. The spruce tree abounds everywhere, and as it is the most desirable of all varieties for pulp, it is even now being looked after for that purpose. This region too is the home of a great variety of the most valuable of the fur bearing animals whose existence is dependent on the preservation of the forest. Within it are many great lakes and rivers which, owing to the cool temperature of the water, contain fish of the finest quality.

We have also in those wilds, owing to the rough character of the country, rapids and waterfalls innumerable, which will furnish sufficient power for all purposes at little expense. Of its mineral wealth it is too early to speak, but the example of the Yukon teaches us that the explorer need not confine himself to the lower latitudes, and as timber is one of the great requisites for mining, the forest is necessary to its success.

But here too, important as the forest is for the purposes I have named, it is even more so for its influences in various ways. Time will not permit me to notice at any length, perhaps, the most important of all reasons for immediate attention to our forestry problem, and that is the necessity that the country at the sources of our water supply should be kept in forest. Denude for instance, the eastern slope of the Rocky Mountains of its forest growth, and as sure as result follows cause, you will destroy



the great rivers that have their sources there. You will create a raging torrent for a few weeks in the spring, and after that a water famine. You will destroy the North and South Saskatchewan, the Athabasca, and the Peace Rivers, and you will make a desert of our new Western Provinces. Your irrigation canals in Alberta will be raging torrents for a short time, and devoid of water when it is required. You will simply bring about a condition of affairs which anyone can see to-day in Southern Europe, in Northern Africa, and in Asia Minor, where large areas of country once fertile are now, owing to the denudation of the timber on the mountain side, practically a desert.

But let us look nearer home. The future of this City of Ottawa, as an industrial centre, depends on the valuable water powers of the Ottawa and Gatineau so near at hand, but unless precautions are early taken to preserve the forests at the head waters of these streams, we will have raging floods for a short time in the spring, followed by great scarcity of water later on, which will render the power so unstable as to be practically worthless.

Again, to say nothing of the evil effects on the fertile lands further south that would follow the destruction of the forests lying north of the provinces which at present form a barrier against the northern air currents, the severe winter of those high northern latitudes would be made almost intolerable by the Arctic winds that would then blow uninterruptedly over the denuded land. The fact is that voices come to us from all quarters calling us to protect our timber areas.

#### WHAT ARE WE DOING?

I shall in a few words try to answer this question, so far as the Dominion lands are concerned, but it must be admitted that our efforts are small indeed compared with what should be done, but nevertheless sufficient to show remarkable results. Fires are the great enemy of our natural forest, and these usually accompany the early opening up of the country. The building of railways, the use of fire in clearing the land by settlers, and the camp fires of travellers are among the agencies that have caused great destruction of timber in the past. Lightning has also contributed, but in a much smaller degree. The latter is uncontrollable, but the destruction from the other causes may be greatly lessened by due precautions and the enforcement of regulations. Not only during the construction of railways through the timber are great precautions necessary, but after the roads are in operation the sparks from the engines are liable to start disastrous fires. This latter is a question that I will not pursue further, but it is worthy of further attention at this meeting.

In 1901 a system of forest patrol and guardianship on Dominion lands was started which has been somewhat extended since. I cannot give details of the system; suffice to say that rangers are assigned certain territory where it is deemed their work is most required. Each of these men is under the supervision of someone in the district, usually the head forest ranger, crown timber agent, or someone known to the Department. It is the duty of this supervising officer to instruct the ranger when to start work and when to quit and to certify to his time of service before his account is paid. In case of a dangerous fire starting, which requires more men to control it, the ranger has authority to engage such men for that particular purpose.

During the past season we had about forty regular rangers employed, principally in the Railway Belt in British Columbia, along the foothills of the Rocky Mountains, along the North Saskatchewan River and country north of that river, along the Athabasca, and in the wooded districts of Manitoba and Saskatchewan.

As to the result of such a service, the railway belt in British Columbia furnishes the best example. Prior to the adoption of the fire service five years ago, there was annual destruction of large quantities of merchantable timber, while during the past five years practically none has been lost, notwithstanding that they have had a succession of very dry summers, and outside of this railway belt hundreds of millions of feet of magnificent timber have been destroyed.

No better investment of public funds can be conceived of than in this protective service. What town or city would be guilty of such folly as to refuse to afford some system of protection against fire for its buildings, and why should the nation fail to take similar precautions to protect its own forest property? The buildings in a town or city can be replaced in a year while a century or more would be required for the restoration of a forest.

Within the past year the Forestry Branch has started making a careful examination of the forest reserves, and it is the intention to continue this work till we have a complete knowledge of the timber on them, the quantity, varieties and quality, rate of growth, etc., with a view of removing the dead and down timber and harvesting the full grown crop and fostering a permanent reproduction. It is also hoped to be able to employ expert men in the examination of other timber areas, in order to obtain information as to what areas it is desirable to further set aside as reserves.

One difficulty in our work is to know what we have. We know practically nothing of our timber and other natural resources extending over a large proportion of our possessions.

In the early history of Canada the pioneer was very much in evidence, but when the people settled down to sedentary occupations the spirit of adventure seemed to die out so that to-day we know no more, perhaps less, of our unoccupied wilderness than did the voyageur of two hundred years ago.

Exploration in advance of settlement is a necessity. With the knowledge that this would furnish us we would be able to assign such districts to agriculture as would be best suited for that purpose and to leave in forest land not adapted for agriculture, but suited for the growth of timber.

Canada is practically the only country in the northern hemisphere to which the eyes of the world are turned for a timber supply in the time of great scarcity which is fast overtaking us. Let us at once take means to preserve what we have for this contingency. Let us remember not only our present supply, but that we are dealing with that kingdom of nature where the life forces are at work and where reproduction and growth may indefinitely prolong the supply if nature is not prejudicially interfered with.

The attention that has hitherto been given to the forest in this country has been in cutting it down, either for the value of the timber or to get rid of it, in order that the land might be more profitably employed for agriculture; but the day has now arrived when we should cease to regard our productive forests as mines from which only a fixed amount of wealth can be obtained and then abandoned. We should recognize the fact of continuous growth and reproduction of the same varieties, crop succeeding crop for indefinite periods of time. To be sure, it takes about one hundred years for the growth of a mature timber crop, but it requires no labour on our part and it asks only that we allow nature, without interruption, to do its part and generally too on land useless for other purposes.

Owing to the long period required for the production of a mature timber crop the individual cannot be expected to take the same interest in it that he does in agricultural crops that mature in one year, and for this reason forestry belongs more to the state whose life is not measured by years, but by centuries. There is another reason why forestry in this country belongs more exclusively to the state than in perhaps any other country in the world, and it is owing to the fact that most of the land on which our valuable timber grows is still held by the Crown: and considering that the nation is the owner it is most appropriate that this meeting is called in order that the Government may have the views of those competent to give advice on a matter that they are called to administer.

Most of the countries of Europe make the administration of their forests one of their most important departments of



government. India, through the efforts of Sir Dietrich Brandis now possesses a forestry service which is not only producing excellent financial results, but is also working on lines that are greatly benefiting the country in conserving its water supply that was rapidly becoming exhausted. The United States within the past few years has awakened to the necessity of action and is now wisely expending large sums in the service, and there is no reason why Canada with the timber wealth it possesses, and with the advantages of Government ownership to which I have referred, should not take a leading place among the nations of the world in its forestry management, and this convention which might be called a forest parliament can do very much by resolution or otherwise to further this desirable end.

In this connection there is just one more point that I would like to submit for your consideration. It is one that I have had in mind for some time and which I am fully persuaded could be adopted without difficulty and would be greatly in the public interest. It is this, that in all future patents of timbered land a proviso should be inserted that at least 10% of the area conveyed should be left in timber; that the timber growing thereon should be the property of the patentee, but only to be cut under the authority and supervision of the Government. I believe such a reservation was made in some of the seigniorial conveyances in Lower Canada, and the old Upper Canada Land Company if I am not mistaken, made a similar provision in some of their deeds.

I have little time left to say anything on tree planting on the plains which the Forestry Branch of the Department of the Interior has started there in cooperation with the settlers, and it is unnecessary that I should do so as Mr. Ross, the Assistant Superintendent, will present a paper dealing with that branch of our work. It is sufficient to say that when we have sent out in the spring the nursery stock now ready for shipment we will have distributed in all about 7,000,000 trees free of charge to settlers living on the bare prairie. The system we have adopted is meeting with gratifying success, and it is confidently predicted it will prove of incalculable benefit to the great plains region.

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A number of the illustrations in the last annual report of the Canadian Forestry Association were, by oversight, not credited to the Forest Service of the United States, through whose courtesy they were obtained by Dr. Judson F. Clark.



## A CANADIAN FOREST POLICY.

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DR. JUDSON F. CLARK, FORESTER FOR THE  
PROVINCE OF ONTARIO.

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When an individual of a nation is urged to undertake any new enterprise the advocate must be prepared to show that it is not only practicable and desirable, but that it is a business proposition, or in other words, that it will pay. That there are sentimental considerations urging better care of the forests is undeniable. That they should have weight is equally indisputable. But forestry is absolutely independent of such, its appeal to-day is as a business proposition to business men, and more especially as a business proposition to statesmen, for the whole history of forests and forestry from the time of ancient Babylon to the present has been a demonstration of the fact that the State is the best, if not the only good forester.

Personally, I think it is beyond doubt that the development of a rational, and therefore practical and business-like, forest policy by the Canadian Provinces and the Federal Government will have a greater influence on the prosperity and happiness of our country half a century hence than the solution of any other problem which is within the power of our generation to solve.

There are at least three reasons of paramount importance why Canadian forests should be managed with a view to the production of wood crops in perpetuity. These reasons have already been repeatedly discussed at the different sessions of the Convention. Permit me to repeat them briefly by way of emphasis and as a foundation on which to base some recommendations for a national forest policy.

### *For the Permanence of Lumbering Industries.*

1. The necessity of a *permanent* supply of logs for the maintenance of our great and growing lumbering and other wood-working industries.

The products of these industries are absolutely essential for the future of our production, our transportation, and our manufactures. Aside, indeed, from the character of its people there is nothing which contributes so greatly to the prosperity and happiness of a people than an abundant supply of wood at reasonable prices. Wood forms the very corner-stone of modern

industrial life, and as years go by modern civilized man demands and uses more and more wood, all substitution by iron, steel, cement, etc., to the contrary notwithstanding.

There are some who are better acquainted with the forests than the markets, and others who are acquainted with neither forest nor markets, who still believe and speak of Canada's "inexhaustible" forests. Take any man through a 400,000 acre lot of fine forest so thoroughly that he will have seen all the trees, and it is most likely that he will be ready to believe in inexhaustible forests. Tell him that all the trees that he has seen would hardly supply the needs of the railways of North America for cross-ties for a single year, and his "inexhaustible" will appear as futile as it is. We have great but diminishing forests and great and ever growing needs for forest products.

#### *For the Conservation of Stream Flow.*

2. Second only in importance to the function of the forest as a producer of wood is its function as a regulator of the flow of streams.

Canada's wealth in her water-powers is very large. Some one has estimated that two-fifths of the water powers of the world are found on Canadian soil. Whether this be correct or not there is no doubt but that the water-powers of Canada vastly excel those of any other nation: What this will mean for her industrial future it is impossible to forecast, perhaps impossible to exaggerate. Add to this the value of the streams for irrigation, domestic use, and navigation, and who would dare guess how many figures would be required to express the value of Canada's streams a century or even half a century hence if maintained in their present efficiency?

If the forest lands of Canada be placed under a rational forest management, the present efficiency, by which I mean of course the regularity of her stream flow, may not be maintained only, but much increased. Present methods of lumbering with their accompaniment of fire on the lumbered lands are annually and to a large extent permanently, subtracting from the value of this great national asset.

#### *For Public Revenue.*

3. A third reason for conducting lumbering operations on non-agricultural lands with a view to improving and perpetuating the forests is found in the fact that it is only by maintaining such lands under forest crops that they may be made to permanently contribute to the wealth of the Provinces or the Nation. Compared acre for acre with arable lands, these rough lands have a low producing capacity. The vastness of the area involved, however, places the non-agricultural lands of Canada in the front rank of her natural resources.

Not only is it a great national duty born of necessity—the necessities of the future—that Canada care for her forests, but it will inevitably prove a highly remunerative business proposition.

*Forest Situation in North America.*

North America to-day cuts three-fifths and consumes more than one-half of the total lumber production of the whole world. This prodigious consumption is very rapidly increasing both on account of an increase in the per capita consumption and the consuming population. There can be no manner of doubt but that the present annual cut together with that destroyed by fire vastly exceeds the net annual production by growth. In other words a wood famine in North America is already in sight. I was asked the other day when it was due to strike. I replied that as near as I could interpret the signs of the times, the year 1900 would be about right, and that the pressure of prices was likely to become increasingly burdensome from decade to decade until the famine would be unanimously admitted. I understand that many purchasers of lumber are already admitting it.

*Canada's Advantageous Position.*

Canada will, if she be wise, be more interested in this wood famine as a seller than as a purchaser, and herein lies the possibilities of a great and ever growing revenue from her public forest lands.

The Canadian forests, which form beyond question the world's greatest remaining reserve of coniferous timber, form a band across the continent from the Atlantic to the Pacific bordering the richest farming and manufacturing area in the whole world. The population of the consuming area tributary to our forests has increased four-fold during the last half century, but its wood consumption has increased ten-fold. This marvellous increase in the use of forest products has already established stumpage prices which put national wood culture on a satisfactory financial basis from the standpoint of revenue alone. It should not be forgotten that the rise in prices which makes forestry a business proposition has come about in the face of an exploitation of the forests on both private and public lands such as was never seen elsewhere in the history of lumbering and cannot be again repeated in North America nor on any other continent.

The territory tributary to our Canadian forests which increased its wood consumption ten-fold during the past half century is to a very large extent merely on the threshold of its industrial development. Nothing is more certain than that

the present demand for the products of our forests will be indefinitely maintained—nothing more probable than that it will be greatly increased.

In view, then, of the desirability of caring for the forests as a sound business proposition from the standpoint of direct financial returns and its necessity from the standpoint of wood production and water conservation, I submit that no time could be more opportune than the present for the inauguration of a national forest policy having for its object the conservation of the forests by wise use.

### *Forest Protection.*

In this forest policy first place must of course be given to forest protection and more particularly to the prevention of forest fires, for without reasonable safety in this regard there can be no forest management. Considerable progress has already been made by several Provinces in this matter, but everywhere much remains to be done. Further progress is needed along three lines, namely:

Improved fire laws.

More efficient administration of the fire laws, and the

Disposal of debris incident to lumbering operations.

Nova Scotia has at present the best fire law though it is in some respects surpassed by that of New Brunswick, and Ontario has the most efficient administration.

### *Practicability of Disposing of Debris.*

In the report of the Ontario Bureau of Forestry for 1904 I have discussed in detail the practicability of burning the debris incident to lumbering operations in pineries. I shall only repeat here that it has been demonstrated that a good clean job of brush burning may be done on pine lands at a cost varying according to local circumstances of from 12 to 25 cents per M. feet, board measure, of the timber cut. Whether a similar burning of the brush on spruce lands be also practicable has not yet been demonstrated by any fair test on a commercial scale. I submit, however, that the making of such a test is one of the most urgent duties of the Provinces selling pulpwood stumpage. It will pay any Province vastly better to take ten or fifteen cents less per cord for its pulpwood and secure the safety and advantage to reproduction which goes with the burning of the debris than to secure the utmost present cash return and leave the areas cut over for pulpwood in the deplorable and menacing condition which is to-day characteristic of Canadian pulpwood slashings.

It need scarcely be added that the state rather than the



lumberman should in all cases bear the expense of such safety measures, for it is in the interest of the future citizens of the state that they are undertaken.

#### *Woodland Taxation.*

Forest taxation is, next to fire protection, the most important consideration in planning forest management on privately owned lands. Governments have in their control of the method and amount of taxation a powerful lever to foster or destroy the practice of forestry by private owners. Under normal conditions no woodland owner can be exempted from a fair and equitable share in the burden of government. Where, however, the tendency to deforest reaches the point where the general interests of a community are endangered, the partial or complete exemption from taxation of such woodlands as are devoted exclusively to forest purposes and come up to a reasonable standard of production may be resorted to as a remedial measure; or the taxation may be shifted from an annual tax on the land to a stumpage tax on the annual cut, thus converting the tax itself into a measure of restraint as regards deforestation.

#### *Classification of Public Lands.*

An important feature of a Canadian forest policy must be the exploration and classification of the public lands. Such lands as contain a satisfactory proportion of good plow lands and are reasonably accessible to markets should be opened for settlement as the land is required for agricultural development. Townships or larger areas in which the non-agricultural lands predominate should under no circumstances be opened for settlement but should be constituted Provincial or Federal Forest Reserves and be devoted to timber production in perpetuity.

Just what proportion of plow land contained should entitle a township or district to be classed as suitable for agricultural settlement is open to debate. In deciding this point it should be kept clearly in mind that a mistake in choosing too high a standard for the agricultural lands may be subsequently remedied at any time without embarrassment or loss, while the mistake of opening up for settlement lands unsuited for agriculture is certain to be a great and lasting injury to both settler and Province, and is well nigh irremediable, as witness many townships in Muskoka, Haliburton, and elsewhere.

#### *Municipal Forest Reserves.*

A second class of forest reserves which the Provinces would do well to foster is what may be termed Municipal Forest Reserves.

There are many townships having within their boundaries considerable areas of waste lands which after trial have been abandoned as unsuitable for growing field crops. The only hope of restoring such lands to useful production is by reforestation, and there are many good reasons that may be urged for the undertaking of the enterprise by the local municipality.

It would be good policy for the Provinces to assist such municipalities as are willing to establish municipal forest reserves by advancing the money for the purchase of the lands, and by organizing an efficient forest service for their management. In the course of time, varying from 15 years in the more southern parts to 30 or 35 years in northern districts, the townships would be in receipt of a steady and very considerable income from their municipal forests for the easement of local taxation. There are many municipalities in Europe having no higher prices for forest products than obtain in Western Ontario to-day whose income from such municipal forests pays the entire expense of maintaining schools, roads, and other local improvements, and in not a few cases there is a surplus which is annually divided as a cash bonus among the citizens.

Such a system of municipal forest reserves could with the utmost advantage be extended to the newer districts where townships are being opened for settlement. All that would be necessary would in this case be to select and reserve from location at the time of the survey a suitable area in the part of the township least adapted for agriculture. Such reserves being already stocked with merchantable timber would be capable of yielding a revenue to the municipality from the first.

#### *Practical Forest Management.*

The central feature of a forest policy and that which gives real worth to all the rest is of course the introduction of a system of practical forest management, having for its aim the perpetuation and improvement of the forest by judicious lumbering.

Canadian forest management will naturally differ widely from European forest management, for our forests, our transportation, our markets, and our people all differ widely. It will also differ somewhat from the forestry of our neighbours to the south, for there are characteristic Canadian conditions to be met—not the least of which is the radical difference in forest ownership and the relations existing between the lumbermen and the State. Canadian foresters may of course learn much from the foresters of Europe and will doubtless learn much more from those of the United States where many of the conditions are very similar, but in the end they must work out their own salvation by the development of a system of Canadian forest management designed especially to meet Canadian forest conditions.

*Stock-Taking of Timber Resources.*

As a first step in this direction it will be the duty of the Provinces to undertake a systematic stock-taking of their timber resources, for without a knowledge as to what they have in the way of standing timber, any attempt at forest management must be blind and ineffective. This stock-taking will naturally include the kind, quantity, quality, state of maturity, rate of growth, and location of the standing timber; the character of the soil and its adaptability for growing particular kinds of timber; and a more or less complete topographic survey having special reference to the drainage, character of the surface and such other features as would be of importance in planning logging operations.

Knowing, then *what* there is and *where* it is and how it may be gotten out, the next step will be to limit logging operations as much as may be practicable to districts where the stands are mature or overmature. The mature timber must be sold under such conditions as will conserve alike the interests of the lumberman and those of the Province. The price paid for the logs must be made with the clear understanding that they are to be removed under such rules and regulations as will insure the reproduction and future safety of the forest. These rules and regulations must naturally be prepared and published in advance of the sale, that the purchaser may know definitely at the time of the sale the conditions under which he is to conduct the logging operations.

*The Lumberman and Forestry.*

Lumbermen are more interested in the perpetuation of the forests than any other class of citizens, and in any square deal will be found willing to do their share to that end. It is high time, however, that the Canadian Provinces ceased to sell the public timber under a system which makes it in the present financial interest of the logger to despoil the forest. Were the stumpage sold in a proper and business-like way there would be no need to implore the lumberman to think of the nation's posterity rather than his own, a plea which must always be futile, besides it is perfectly practicable to conserve and harmonize the interests of the lumberman and the public, present and future.

*Trained Foresters Necessary.*

Systematic care of forests implies of course a trained forest service.

There was a time when the doctor's office, the court-room, and the deck of a ship were the only places of training for the physician, the lawyer, and the naval officer, just as to-day the lumber camp is the only place of training for those who at pre-



sent direct the cutting of the Canadian forests. But the world has made progress in educational matters in the last fifty years, and to-day we have, established and maintained by the State, military and naval academies, schools of law and medicine, of mining, engineering, agriculture, and other professional and technical schools too numerous to mention.

With her vast interest in forests and forest products there can, I think, be little doubt but that the time has fully come for the establishment of a Canadian School of Forestry for the training of her coming forest service.

### *A Practical Forestry Training.*

Time does not permit me to discuss in any detail the character of the instruction which should be given at such a school. In very brief, I would say that a broad elementary training in the so-called natural sciences and mathematics is a most necessary preparation for the forester's professional training. That the professional training must be as *practical* as possible goes of course without saying. To this end all theoretical instruction must be supplemented by practical investigation and application in the woods. I would go farther and recommend that on the completion of their school work—theoretical and practical—all students who have not previously had a practical training in the lumbering business be required to associate themselves with a lumber firm for a year for the purpose of studying and practically assisting in the various operations from the felling of the tree to the grading of the lumber for the market. This training will prove of value to students not alone in the matter of information gained, but will serve the useful purpose of bringing the foresters and the lumbermen in touch personally and professionally.

### *Assistance for Private Owners.*

The educational side of a national forest policy would be incomplete without provision for the dissemination of a knowledge of improved methods of woodland management for the benefit of the private owners, who control in the aggregate many million acres of woodlands, which scattered as they are throughout the agricultural sections, are acre for acre the most valuable of Canadian forest lands. The Ontario Department of Agriculture and the Dominion Forestry Branch have already made an excellent beginning in this great educational work.

Such in brief is a glimpse of Canada's responsibility, opportunity, and duty. As we accept our responsibilities and as we do our duty according to our opportunity will we be judged by future generations as having been worthy or unworthy custodians of an almost unbounded natural resource.





Forest on a Hardwood Ridge from which the large Yellow Birch has been cut. Madawaska, Ontario



## THE RELATION BETWEEN WATER-POWERS AND FORESTS.

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CECIL B. SMITH, C.E., CHAIRMAN, TEMISCAMING RAILWAY  
COMMISSION.

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CANADA is well supplied with coal, both in its extreme Eastern and Western Provinces, but over an area extending for three thousand miles from New Brunswick to the foothills of the Rockies, and from the United States boundary as far Northward as we have knowledge of a definite nature, there are no coal measures of importance that have yet been discovered; and whilst this deficiency is not an absolutely vital one, owing to the abundance of coal in the neighbouring United States, yet it is of great economic importance, and has been a large factor in retarding manufacturing in this country.

Now that wood for fuel has become scarce and expensive in many localities, there is a double drain on the pockets of our people, and a continually increasing stream of money is flowing across our Southern border to purchase coal for heating and power purposes.

Until quite recently this had not appeared very important because wood, being plentiful, was largely and often wastefully used for fuel and power, and because manufacturing was not carried on extensively, and therefore the power problem did not loom large in the public view. However, the last ten years have worked many changes, and we are now face to face with a condition and not a theory.

Street and suburban railways are operated by electricity; Cities and towns demand electric lighting; manufactures are increasing by leaps and bounds, and more and more coal continues to pour over our frontier to meet our ever growing demand for power.

The natural query is How and To what extent can this unfortunate economic condition be improved upon, and what is the proper channel through which the desired end can best be accomplished?

The direct use of water-power for pumping and grinding is embedded in history, and doubtless such uses will continue to form an important factor in daily life for generations to come; but, excepting in special cases, these uses will be and are, con-

fined to water-powers of small dimensions, and the service must be given in the immediate neighbourhood of the water-power.

Quite recently, however, the transmission of electricity for considerable distances has been fully demonstrated to be feasible and economically important, and at once it became evident that water-powers had assumed an increased market value by reason of the facility with which the power of water could be devoted to the generation of electrical energy, which energy could then be carried without serious loss or prohibitive expense, and in greater or less quantities to power markets and centres of population.

With the preceding statements postulated the natural question arises to what extent are we blessed with water-powers over this coalless area, and how convenient are they to centres of population? Also, what has been accomplished to the present, and what is the future outlook?

If we study a map of Canada we find the area before referred to, to consist, broadly speaking, of two drainage areas: one tributary to the Hudson Sea and the other to the St. Lawrence Valley, the population of the country being chiefly centred in the latter area. Doubtless the Saskatchewan and Winnipeg Rivers will soon become important from a power point of view; the former because of its relation to wheat grinding, the latter because of its nearness to Winnipeg; but looking at the St. Lawrence water-shed, one is at once impressed by the great number of large rivers, flowing Southward from the Height of Land, which all have excellent water-powers, and which, flowing as they do from a wilderness, full of swamps and lakes, are admirably uniform in their run-off, and liable to remain undisturbed for some time to come. The development of these powers is at present chiefly along the lines of milling and grinding, and only where situated near centres of population, such as Ottawa or Montreal, are they devoted to the generating of electricity.

Coming, however, to the rivers of that portion of Ontario, South of the Ottawa River, and of Quebec South of the St. Lawrence River, a different and much less satisfactory condition prevails; and although in earlier generations, these rivers may have been quite steady in their flow, this is, with two or three exceptions, not now the case, owing to the great amount of cleared land and consequent rapid run-off of the flood waters, as soon as the spring thaws have taken place.

Before coming to the main subject of this paper, which is the relation between forestry and water-powers, it may be interesting to dwell for a moment on the financial magnitude of the question under discussion. At the present time there has been developed in Canada about 350,000 H.P. of water-power, which probably, including transmission lines, represents an investment



of \$25,000,000 to \$30,000,000, and considered only on a ten-hour basis, means a saving of at least five tons of coal per horse-power-year, or 1,750,000 tons of coal per year as compared with about 4,500,000 tons annually imported. Now the near future will easily see this amount doubled or trebled if intelligent and comprehensive plans are adopted for development and distribution, and not only can a large amount of money be kept in our country, but industries and public utilities will be benefited by being supplied with electricity at reasonable rates.

Speaking generally, water-powers are valuable in proportion to the amount of water available at the periods of low water, which usually occur in August and September, and in February and early March, and it is a matter of common observation that each river is a distinct study in itself, as the variables are not only numerous, but largely beyond the control of man.

The chief features affecting the uniformity and total amount of flow are: (a) Drainage Area. (b) Shape of Area, whether compact or narrow and long. (c) Slope of country. (d) Kind of soil. (e) Rainfall. (f) Evaporation. (g) Condition of soil, whether cultivated, pasture or woodland. (h) Storage, natural or artificial. (i) Control of run-off from storage.

It will be noted that all but the last three items are natural conditions, and therefore beyond the control of man.

However, the large water-power developments which have been attempted to the present have been chiefly made on large rivers, and the pinch of low water has not been so serious as will be the case in the future when increased values will induce the development of smaller rivers to their fullest extent.

The practical problems of the control of river flow in the thickly settled parts of Ontario and Quebec Provinces group themselves naturally into three districts, which will be treated separately.

(A) SOUTHWESTERN ONTARIO. In this district we have the Nottawasaga, Saugeen, Maitland, Ausable, Thames, Grand, Credit and Humber Rivers, all possessing originally valuable water-powers, but without any natural storage for the water, except in the soil, so that as this whole area has been practically denuded of forests and given over to agriculture, the water-powers have been nearly all ruined, and as the creation of artificial storage would be very expensive, and the country is too valuable as farm land to permit of it ever reverting to forest, little can be hoped for in the way of improvement, and the district will necessarily have to rely on Niagara as its chief source of electrical power.

(B) CENTRAL OLD ONTARIO. We find here an entirely different natural condition, and owing to this an exceptional

opportunity presents itself for intelligent and comprehensive action which will, if carried out, be of great benefit to future generations.

The French, Maganatewan, Muskoka, Severn, Trent, Moira, Rideau, Mississippi, Madawaska, Bonnechere, Petawahweh and Mattawan Rivers, with their sources in lakes and swamps, all rise from a common plateau, largely unfit for cultivation, still chiefly in forest, and much of it still in the hands of the crown. They all possess excellent water-powers, many even now near to industrial centres, and up to the present time developed only to a very limited extent. Much of this central plateau is still in virgin forest, but much more has been cut or burnt over, and much partly cleared, on which thousands of families are eking out a meagre and precarious existence on land which would be much better occupied if devoted to the growth of another forest of pine and other trees indigenous to the region.

Those who have studied re-forestry will be agreed that to re-forest on *cleared* land means *close* planting as otherwise the trees form their limbs near the ground and become less valuable as timber. But to re-forest a large area of cleared land in this manner would be beyond the means even of a Government, and therefore the idea suggests itself that the proper course to pursue would be to hold this central plateau as it is at present, (and possibly even to re-forest some partly cleared or cut over districts), to limit the cutting of timber to ripe trees only, under crown supervision; to replant from nurseries, and guard from fires, and in connection therewith to gradually create a system of storages for water near the sources of the various rivers mentioned; lakes already exist in abundance: all that is needed is the construction of inexpensive dams to supplement those that have already been built by the Dominion Government on the Trent Canal, and elsewhere by lumbermen, and to place the control of the flow of water from these various reservoirs in the hands of proper parties, interested in making the most of the water-powers dependant on these lakes for the uniformity of their supply of water.

The question involved in this district thus presents two phases: one, the improvement of water-powers possessing wonderful natural storage, and amounting when developed to 200,000 or 300,000 horse-power, representing at least 1,500,000 tons of coal per year, and on the other hand the upbuilding of an extensive forest district naturally adapted to the growth of pine, but largely unfit for cultivation.

(C) SOUTHERN QUEBEC. The Yamaska, St. Francis and Chaudiere with other smaller rivers, have their sources in the foothills of the Notre Dame or White Mountains, and possess valuable lake storage, and while this district is largely arable and fairly well cleared, there are considerable areas which it would pay

to hold for all time as forest reserves in order to equalize the flow in the rivers above mentioned, and at the same time prepare valuable forests against the time when timber will be in still greater demand than it is at present.

Doubtless similar problems which exist in New Brunswick demand similar treatment, but unfortunately the sources of the St. John River are international in character, which complicates the problem, and the remaining rivers of the Province are not supplied with extensive natural storage, and must depend on soil storage only. Holding the uplands of this Province in forest seems essential to a preservation of its streams.

The relationship between stream flow and forests is an intimate one and in a country possessing valuable water-powers such as exist in almost every Province of our Dominion, this must be continually borne in mind.

The problem is too vast to consider in any other way than as one of preserving our present forests, rather than in creating new ones, and if the far-reaching effect of such preservation is thought of in connection with the preservation and improvement of our water-powers, an added incentive will be given to the natural desire to perpetuate for future generations our present valuable woodlands.

Fortunately the two interests are in harmony, and in preserving our forests, we can aid in developing to its fullest extent an equally valuable asset in our water-powers, which fortunately are to be found in every corner of the land.

## FARM FORESTRY IN THE EASTERN PROVINCES.

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REV. A. E. BURKE, ALBERTON, P.E.I.

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There can be no phase of forestry, which fortunately is beginning to receive somewhat of the great attention which it deserves from the central authority, as essential to the general prosperity of the country as well as productive of direct influence on the conservation of its great water sources, the health of its people and the beauty and charm of life amongst us—nothing so eminently practical in its effect on the greatest number of our population as farm forestry. The farmer in the more fortunate wood-growing divisions of Canada has only within a comparatively short time awakened to the value of trees not only as a source of fuel supply—and fuel will always be a heavy charge against farm revenue—and the lumber which is always a requisite about the place, but as a temperer of the adverse winds, a protector of the fruit plantation, the pasturing cattle, the dwellers on the steading themselves; and as a source of beauty and comfort beyond anything else we can name.

Having to contend with the great forest at settlement, it is not wonderful that it was considered by the average pioneer an enemy; and, therefore, to be removed at the earliest possible moment. Even where wood and wood products were little sought, the torch and axe were in requisition until all the acres of the holding were for the most part bare and treeless. This did not so much matter where the misguided operator was somewhat isolated, but when all the land became occupied and a general policy of destruction was adopted, the effect was signally adverse to the productiveness of the lands and the comfort of the land holders. In the large provinces, even areas which would constitute states in smaller and less favoured countries were thus stripped; in the smaller provinces the dire result of such a short-sighted policy became more and more of an affliction. The new additions to the older provinces formed a magnificent reserve and afforded all the timber supply necessary for local requirements; the older sections began to find out the error of complete denudation; the public mind became awakened and informed to sane principles; and early an attempt to retrieve lost ground was discernible. That disposition to help themselves on the part of the people has actuated the Government of Ontario in the generous and organized system of re-



afforestation, educational and practical, which it is now pursuing. Quebec still has its great forests, but the settled portions are, in many cases, bare of trees. It has no such systematic policy as to forestry as its great sister province; but the farmer there, too, is alive at last to the advantages of the wood-lot, and will henceforward compel an enlightened policy not only with regard to the maintenance of the proper proportion of field and forest of his own locality, but also, since it affects him and the people generally, a conservative administration of the great forests of the Province.

In Maritime Canada there is still much to be done. The three Atlantic Provinces, smaller than the others as they are, and, therefore, divided and weakened in the effort which the times so imperatively demand in the way of forestry, can scarcely be said to have given this question the consideration it deserves.

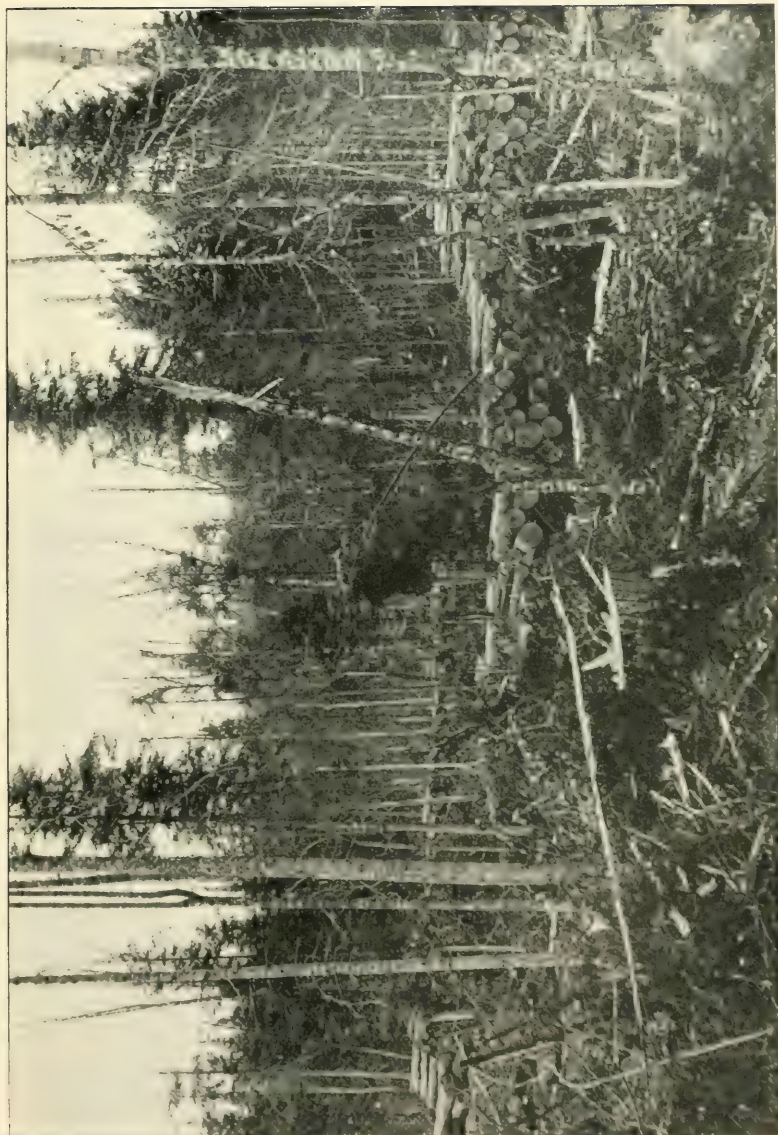
Apart from Prince Edward Island, agriculture has not been the exclusive occupation of their people. Nova Scotia is a large mineral Province, and the development of these riches has occupied her attention almost entirely. Out of thirteen millions of acres scarcely one million is given up exclusively to agriculture, and except in the alluvial stretches which form her rich fodder fields, the land has not been in any locality so completely denuded as to threaten the failure or to adversely affect the growing capacity of her cultivated fields. An economic timber policy is greatly to be desired, however, and this will very beneficially affect not only the cultivated areas of to-day, but those which to-morrow may in the needs of greater production, be subjected to the plough.

New Brunswick is a well wooded Province of seventeen million of acres, only a very small portion of which is given over to agriculture. The growing of timber for the money that is in it has been always a commercial pursuit of the people although no systematic forestry has ever been inaugurated. A great portion of the lands still remain under the Crown. Some ten millions of acres are granted lands, it is true, but even those are practically half under forest of some kind. Certainly less than five millions of acres are devoted to crop production; and, so far as we know, no organized system of farm forestry has yet been demanded or evolved. Of the seven and a half millions under the Crown, possibly six and a quarter are under timber license and the remainder burnt or barren areas. In the farming sections the errors of other places are apparent. The wood has been cleared away and in many cases whole portions of country bared of trees to the great disadvantage of successful agriculture. New Brunswick, while not under present circumstances vindicating to itself, the title of an agricultural province is nevertheless susceptible of successful field culture much more generally than

has at all been attempted, and quite as much, if not more so, than countries which are freely accorded an agricultural name. Professor Johnston, F.R.S.E., who examined the Province carefully, reports that its soil is capable of producing food for five or six millions of people; capable of growing all the common crops on which man and beast depend; and possessing a climate suitable for the growing of crops in quantity and quality not inferior to the average soil of England. It is, therefore, greatly to be desired that, as agriculture must play a great part in the development of this Province when the population of the country becomes intensified, as we know it will in the not too distant future, a sane system of forest preservation be early resorted to, so that the fruitfulness of the future crop-producing areas may not be radically impaired.

The third and most generally fertile Province of Maritime Canada, termed by its admirers "the Garden of the Gulf" and "the Million-acre Farm," has already suffered, and is suffering very considerably every year, from the deprivation of its forest. The lands for the most part have passed from the Crown—only about fourteen thousand out of the one million two hundred and eighty thousand acres, are still in its possession, and these lands have been stripped of everything worth taking away long ago. The farmers themselves are, in the great majority of cases, obliged to purchase coal for fuel from the mines of the neighbouring Province of Nova Scotia, and building material from the New Brunswick mills. The farms thus bared are not at all being cultivated to their utmost extent; the Island is susceptible of maintaining under right conditions a system of the most intensive agriculture, and one which would sustain in comfort a population five times greater than its present one. The portions cultivated—and they are much greater than those of the other Maritime Provinces, comparatively greater than any other portion of Canada comparatively fruitful as they are, would be doubly so if the requisite forest influences were in full play. There are numerous places completely denuded which nature only intended for tree production and the safe-guarding of the splendid water sources with which the Province was originally endowed. One thought given to the insular nature of the country, its situation in the midst of a great wind-swept Gulf and its smallness, will convince anyone that the losses incurred to its husbandry, where unprotected from the blizzards of winter and the drying-out winds of summer, as well as the erosion which spring freshets and fall rains occasion, must be very serious indeed.

Little more than one hundred years have sufficed to transform this Province from a complete forest to its present bare and exposed condition. Then its flora was of the most engaging



Rollways of Pine Logs, showing the condition of the forest after lumbering





to be met with in the Western Hemisphere comprising a large range of coniferous and deciduous trees among them those mentioned by the intrepid explorer, Jacques Cartier, when on July 1st, 1534, he first trod Canadian soil in the Island Province. His Relations contain an admiring mention of our beautiful forest trees and in it he enumerates with great exactness the fir, the black, red and white spruce, the stately hemlock, the white and red pine, the larch and the cedar and the maple in four varieties; the white, black, yellow and canoe birch; the wide-spreading beech; the elm; the ash in variety; the oak, the aspen, the cherry and many other inferior species. The axe, the torch, man's cupidity and the utter disregard of the governing power have almost swept away this precious heritage.

Within recent years we have come to recognize our sorry plight; we have aroused the public conscience; we have attempted to quicken the provincial authorities to some action which may save us from further loss, and start us out on the way of retrieval. A Commission was appointed to examine into the case a few years ago, and whilst their report may have little technical value it has by sounding the alarm at least manifested to the apathetic farmer a condition of things he otherwise might never have realized, to wit, that forest growth is essential in most situations, at all events, as a protection to the farm from the chilling winds which sweep over the Gulf and adversely affect all life upon the Island in winter, resulting often in many of the dread diseases which come from exposure to such temperature, and increasing to an extent unknown in the old days, when the country was tree clad, the scourge of consumption, the Great White Plague, now a general menace.

Forest protection is necessary to the farm lands so that water can penetrate the soil and be available for crop production. If the whole farm area is deprived of the advantages which the forest floor affords for the conservation of the water precipitated, the exposed soil hardened by the tramping of cattle and the patter of raindrops, must shed it superficially if it is anywise compact. As a consequence these waters are not only lost to crop production but, gathering into rivulets, carry great quantities of the rich soil with them as well as furrowing the fields with gullies and runs. This carries away valuable plant food, covers the lowlands with silt, damages the roads, and swelling the water courses causes them to break their bounds and dissipate the water, which by subterranean channels should feed them later. In Canada to-day it is estimated that not less than two hundred miles of fertile soil are washed into rivers and brooks annually, and those who examine the public accounts will be surprised at the immense sums of money expended each season in digging out those lost farms from the harbours and

rivers of the Dominion. Many thousands of dollars worth of crops and other property are destroyed by overflows and floods and many more by the droughts which one Province or another suffers yearly—all or nearly all of which would be avoided if the water supply of the country were properly regulated; and the conservation and management of the forest is the only agency available to this end.

The tempering effect of the forest on the farm need only be mentioned. By modifying the velocity and temperature of strong winds a great reduction is brought about in the protected fields. We plant wind-breaks about our orchards and out-buildings to secure shelter and thus temper the hot winds of summer and the cold blasts of winter. An extension of this system to the fields would greatly increase the yield in crops. The increased moisture which forest protection affords because of the decreased evaporative power of the winds, the velocity of which has been reduced by passing through forest, is very considerable. It is estimated that a foot in height of forest growth will protect one rod in distance, and a succession of tree plantations would very materially increase this protective power. The forest tempers the farm, too, by preventing deep freezing of the soil and shortening the cold of winter.

Whether or not the forest may increase the water fall over the adjacent area is still a question open to discussion, but no one doubts that by transpiration, the moisture near forests is greatly increased and vegetation thus beneficially affected. But even if no increase is admitted in the rainfall because of forest influences the availability of whatever does fall is greatly increased by a forest growth properly located. In forests the water percolates through the soil most thoroughly and the snow fall is caught by them and melted so gradually as to be subject to little waste. Larger amounts of water are, therefore, held by the forest soil and sink deeper into it than into that of the open fields. The sun and wind, the great moisture-dissipating agents, not having full play in the forest, the conservation of moisture is much easier than elsewhere. The water supply available in the soil is thus increased 50% scientists tell us. Increased percolation and decreased evaporation afford large quantities of moisture to feed the springs and sub-soil waters and these are finally made available to the growing crops in times of extreme drought.

The forest as well as watering, tempering and protecting the farm supplies it with much useful and valuable material. Those who have to purchase coal at big prices know how it eats into the year's revenues. Once established the wood-lot properly handled will reproduce itself and supply in reasonable proportions not only the fuel but much of the timber and lumber

required in the up-keep and extension of farm construction. The poorest portion of the farm, that unfit for tillage, may thus be made to bring in the best returns. On a well regulated farm of one hundred acres 25% should be left in forest. In harvesting, the openings should not be made so large at any time in this wood-lot as not to be easily re-seeded from the adjacent trees.

The forest will not only benefit the farm and add to its value in all the ways we have been describing, but it will so beautify it as to make life doubly pleasureable to those upon it and also to the community in which it is placed. "A thing of beauty is a joy forever"—and what so beautiful as a thrifty tree in the open, a line of trees by the roadside, a clump of trees in some waste corner, a well kept grove or wind-break sheltering the farm buildings, or a wood-lot lifting its head high to the sky in conscious pride of its worth on the rear line of the holding? The value of that farm, if by any necessity it has to be put on the market, is greatly enhanced by such adornment and the extra cost of it has been little or nothing to the farmer when everything is computed. Nay, it has paid him a hundred fold, bettering and blessing his life.

"Nature is man's best teacher. She unfolds  
Her treasures to his search, unseals his eye,  
Illumes his mind, and purifies his heart,  
An influence breathes from all the sights and sounds  
Of her existence."

—*Street.*

The question comes naturally to every lip. "How are we to restore in sections impaired the proportion of forest to field, how maintain it where it exists at present? How are we to bring about in Eastern Canada a sane system of farm forestry?" To our mind a general forestry policy should be quickly and effectually evolved by the central authority, not only with regard to the new countries under its control where the mistakes of older Canada must not be repeated, but also in the older portions where the national life has been adversely affected by the dangers with which the sacrifice of the forest have menaced it in its economic, agronomic, climatic, hygienic and aesthetic relations. As with agriculture even where the provinces have supreme control, a paternal policy productive of the best results has been long adopted federally by which educational and practical assistance has been bestowed, so in the forestic endeavour the presence of the instructor and the bestowal of stock where-with to re-plant may become necessary. The farmer can thus be taught the value of his wood-lot at comparatively little expense to the country, and the result in prosperity and national

happiness will far outreach the returns, great as they have been, in any other line of agricultural effort. A fully equipped Federal Department looking to the maintenance and necessary extension of forestry in every portion of Canada is the necessity of the hour. Let us hope then, that in the general impetus which this Council must give to this great national interest, farm forestry in Eastern Canada will not be overlooked.

## YALE UNIVERSITY FOREST SCHOOL

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THE SUMMER SCHOOL OF FORESTRY is conducted at Milford, Pike County, Penn. The session in 1906 will open July 5th and continue seven weeks.

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**HENRY S. GRAVES, DIRECTOR**  
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1. Two Years' Course for Associate Diploma.
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## Macdonald Institute.

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### Nature Study ♡

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- (2) Three Months' Courses, For actual teachers. September to December, January to March, April to June.

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- (1) Two Years' Normal Course in Domestic Science.
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  - (a) In Domestic Science.
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The Macdonald Institute, through the Ontario Agricultural College, is affiliated with Toronto University, and the work of the above classes will be recognized *pro tanto* in the courses leading to the University degree in Household Science.

**G. C. CREELMAN, President.**

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BILTMORE ESTATE, COMPRISING 130,000 ACRES  
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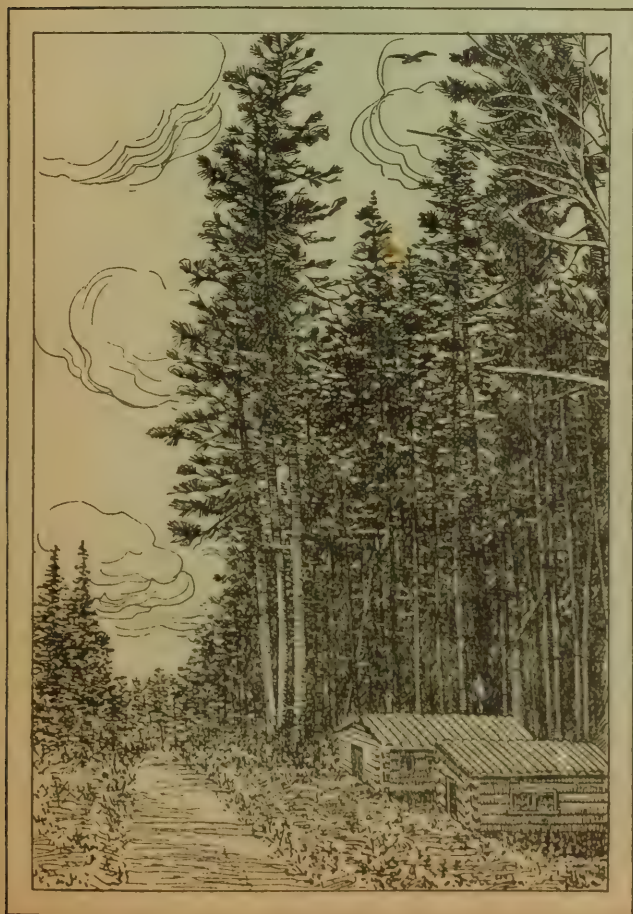
THE management of the forest is identical with the management of the school. The teachings of the school are put into practice in the forest. The course at the school comprises 12 consecutive months of theoretical as well as practical instruction. Object lessons on a large scale are offered in the woods.

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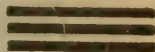
**C. A. SCHENCK, PH. D.,**  
DIRECTOR.



# CANADIAN FORESTRY JOURNAL.



MAY  
1906



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



# Canadian Forestry Association.

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THE RIGHT HONOURABLE SIR WILFRID LAURIER, PREMIER OF CANADA.

## **PRESIDENT:**

E. STEWART, Superintendent of Forestry, Ottawa, Ont.

## **VICE-PRESIDENT:**

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E. STEWART. R. H. CAMPBELL. ROLAND D. CRAIG. J. M. Macoun.

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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary,

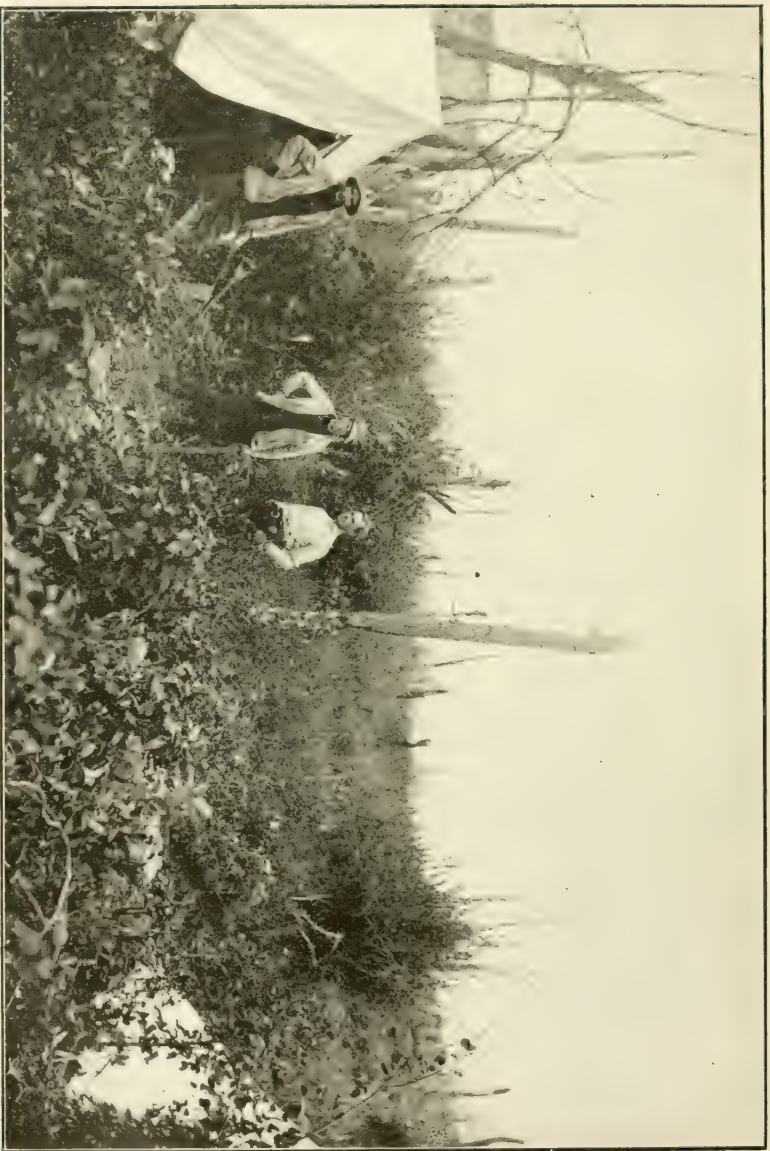
**R. H. CAMPBELL,**

OTTAWA, ONT.

*Department of the Interior.*







Three years after a fire on Turtle Mountain Forest Reserve, showing dense young growth.

# Canadian Forestry Journal.

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VOL. II.

MAY, 1906.

No. 2

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## ANNUAL MEETING OF THE CANADIAN FORESTRY ASSOCIATION.

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The Annual Meeting of the Canadian Forestry Association was held at Ottawa on the 9th March. Among those present were the President, Mr. E. G. Joly de Lotbiniere, Hiram Robinson, J. F. Ellis, Professor John Macoun, Wm. Little, H. M. Price, E. Stewart, W. C. J. Hall, Mr. MacLeod, Miss. M. Robinson, J. M. Macoun, Roland D. Craig, H. C. Wallin, R. H. Campbell.

The report of the Board of Directors was read by the Secretary as follows:—

### REPORT OF THE BOARD OF DIRECTORS OF THE CANADIAN FORESTRY ASSOCIATION.

Your Board beg to submit their report for the year 1905-06, and in doing so can congratulate the Association on the most successful year in its history. It is a subject for some pride to look back to the beginnings of this Association in 1900 when it commenced its career with a handful of members and made its appeal to a public which hardly understood even what the word forestry meant, with its present position, supported by a membership of nearly 1,200 representatives of the whole Dominion and with an aroused public opinion which is ready to listen and anxious to learn.

### FORESTRY CONVENTION.

The most notable event in the past year's history is the Canadian Forestry Convention which was held at Ottawa on the 10th, 11th and 12th January, 1906. This Convention was called by the Right Honourable Sir Wilfrid Laurier, Prime Minister of Canada, in accordance with the suggestion conveyed by him to the last Annual Meeting of the Forestry Association and the call was responded to by a large and representative gathering, which discussed forestry questions for a period of three

days. The interest taken in the proceedings by His Excellency the Governor General, by the Prime Minister, who personally presided over its deliberations, and by Mr. R. L. Borden, leader of the Dominion opposition, assisted much towards its success, and the Forestry Association, under whose auspices the Convention was held, owe the heartiest thanks to them and to those who assisted by the reading of papers and in other ways to the splendid result. The representative character of the Convention, composed as it was of clergymen, politicians, lumbermen, business men, educators, farmers, scientists, journalists, means that the effects will be far reaching. The success of this Convention means the opening of a large opportunity to this Association to advance the forestry movement and full advantage should be taken of the occasion to further the objects for which it exists.

#### MEMBERSHIP.

In view of the Convention, a special effort was made during last year to increase the membership of the Association by sending out circulars of invitation and otherwise, and as a consequence of this work and the interest aroused by the Convention, the number of members has been increased from 562, as reported last year, to 1,161. In this connection the support given by the Banks to the Association deserves special recognition. The following Banks have paid the fees for membership of their Managers in the Association: Bank of Commerce, Merchants' Bank, Bank of Montreal. A comparative statement of the membership for the last two years follows:—

	1905	1906
Nova Scotia .....	21	67
New Brunswick .....	22	77
Prince Edward Island .....	3	6
Quebec .....	113	225
Ontario .....	187	368
Manitoba .....	72	115
Assiniboia .....	22	53
Saskatchewan .....	4	
Alberta .....	42	90
British Columbia .....	32	85
Yukon .....	—	2
Newfoundland .....	1	1
United States .....	32	56
Other Countries .....	11	13
	<hr/>	
	562	1,158
Life Members .....	39	



The receipts for last year were \$2,428, including a balance of \$916.11 from last year, and the expenditure \$1,124.84.

The thanks of the Association are due to the Governments of the provinces of Ontario, Quebec and British Columbia for grants in aid of the work of the Association, and also to the Forestry Branch of the Department of the Interior for providing for the publication of the Annual Report and other services.

It is only right that mention should be made of the work of Miss Robinson of the Forestry Branch, who though not on the recognized official staff of the Association, has rendered efficient service in the keeping of the Treasurer's books and in many other ways.

#### PUBLICATIONS.

The Canadian Forestry Journal has been published throughout the year as a quarterly and it is hoped that it has been satisfactory to the Association. It is desirable that the Annual Meeting should consider this question of the official organ carefully and fully. If the Journal could be issued more frequently its usefulness would be largely increased, and as the present editor has submitted his resignation, it is well to consider if the time has not arrived when provision might be made for an editor and business manager who could devote the greater part of his time to this and similar duties.

In addition to the Forestry Journal, the Association would find it of advantage to issue a series of bulletins for the information of the public and also to supply material to papers and news agencies. Despite all that has been done, there are large circles of public opinion still untouched and it will require persistent and constant effort to thoroughly reach all classes and all parts of the Dominion.

A well edited paper, with a large list of subscribers and frequent publication could, with good business management, obtain an income from advertising that would go far to make it self-supporting. For this purpose a managing editor, who can give most of his time to the work, is a necessity.

The Sixth Annual Report containing the papers and proceedings of the last Annual Meeting was published and distributed as usual. This report serves a special and useful purpose, but it may be considered whether the papers might not appear in the Forestry Journal if publication is made more frequently.

#### VICE-PRESIDENTS.

After the last Annual Meeting the Board of Directors appointed the following Vice-Presidents:—

Prince Edward Island, Rev. A. E. Burke; Nova Scotia, Hon. J. W. Longley; New Brunswick, His Honour J. B. Snowball;

Quebec, Hon. S. N. Parent; Keewatin, His Honour the Lieutenant Governor of Manitoba; Assiniboia, His Honour A. E. Forget; Alberta, Wm. Pearce; Athabasca, F. D. Wilson; British Columbia, Hon. H. Bostock; Manitoba, Hon. J. H. Agnew; Ontario, Hon. Nelson Monteith.

The Resolutions passed at the last Annual Meeting were transmitted to the Minister of Railways, to the Local governments and to others interested and were acknowledged with promises of consideration.

It may be noted that the Transcontinental Railway Commission, in calling for tenders for the construction of the Transcontinental Railway have included special requirements in regard to the protection of the forests along the route from fire, this being a question dealt with by one of the resolutions.

### FOREST FIRES.

Forest fires caused considerable loss in different localities during the past year. In Nova Scotia one village was destroyed. In New Brunswick, Moncton was threatened and for a time the situation in several places was serious. In Quebec the smoke from fires interfered seriously at times with navigation on the St. Lawrence River. Ontario did not suffer heavily nor did the western provinces, except British Columbia. The weather conditions east of the Rocky Mountains during the early part of the season were such as not to require very close patrol service, but later it was found necessary to have the rangers continuously on duty. In British Columbia we seem to be passing through a cycle of dry seasons and that of 1905 was one that threatened the greatest destruction of timber. At one time it was feared that the whole of the valuable timber in the Shuswap country would be swept away, and for weeks a large body of men under the Dominion Fire Rangers were kept constantly fighting the fire with the result that only a small quantity of merchantable timber was destroyed. The Kootenay district seems to have suffered most heavily.

An important work to be done by the Dominion Government is the protection from fire of the large extent of northern forests, as settlement and railway construction extends into them.

### TREE PLANTING.

The Dominion Government is continuing and extending the system of co-operation with the settlers in tree planting which was started in the year 1901. During the past season nearly two million trees were distributed to settlers on the bare prairie, and this spring (1906) a little over that number will be sent out, making a total distribution of about seven million trees, besides a considerable quantity of tree seeds.

The examination made by the inspectors last season showed that about 85% of all hitherto distributed were then growing.

In Ontario, in connection with the Agricultural College, preparations are being made for a supply of trees for distribution in that province, a nursery for that purpose having been established.

#### FOREST RESERVES.

An advance step which has been made in connection with the administration of the Dominion Forest Reserves is the commencement of a regular timber survey. The survey of the Turtle and Moose Mountain Reserves was completed and it is the intention to continue the work next season on the large reserve in the Riding Mountain. The value of such an examination will be to give data as to the quantities of dry and green timber on each reserve, the different species and the annual growth of each species.

Experiments are being made in Nova Scotia by private persons in the reseeded of burnt lands with spruce, the seed being imported from Germany. In one case a tract of ten thousand acres is being seeded.

#### FORESTRY LEGISLATION.

In all the Provincial Legislatures advances in Forest legislation are being foreshadowed and it is expected that the present year will show considerable activity in this respect, both in the Dominion and the Provinces. The Forestry Convention has had a great stimulating effect in this respect.

Invitations have been received from British Columbia and from the Maritime Provinces for the holding of a Summer meeting of the Forestry Association. These invitations will be submitted.

The thanks of the Association are due to the press for valuable assistance, and to the railway companies for their kindness in granting single fares for this meeting.

Respectfully submitted.

A letter from Mr. R. H. Alexander, Secretary of the British Columbia Lumber and Shingle Manufacturers' Association, was submitted by the Secretary, conveying an invitation to the Forestry Association to meet in Vancouver in June.

A similar invitation for a meeting at Halifax, Nova Scotia, was received from Rev. A. E. Burke, and was also submitted to the meeting.

After some discussion it was decided that the invitation from British Columbia should be accepted, provided satisfactory rates could be arranged with the railway companies.

The following changes in the Constitution of the Association were passed:—

Clause 1, setting forth the objects of the Association was amended by adding the following sub-clause:

(6) To secure such forestry legislation from time to time from the Federal and Provincial governments as the general interests demand and the particular needs of the people seem to require.

The office of the Secretary-Treasurer was established, the editor of the official organ was added to the list of officers, and the number of the Board of Directors increased from seven to fifteen. The quorum of the Executive Committee was fixed at five.

The Forestry Journal was discussed and it was decided that as soon as possible it should be made a monthly publication and that, in view of the resignation of the present editor, a permanent editor should be appointed so soon as the funds of the Association will permit.

The election of officers resulted as follows:—

Patron, His Excellency the Governor General; Honorary President, the Right Honourable Sir Wilfrid Laurier; President, E. Stewart; Vice-President, H. M. Price; Secretary-Treasurer, R. H. Campbell; Assistant Secretary, Roland D. Craig; Board of Directors: J. R. Booth, Hiram Robinson, Monsignor J. C. K. Laflamme, Dr. Wm. Saunders, Hon. Sydney Fisher, Thos. Southworth, E. G. Joly de Lotbiniere, Hon. H. Bostock, Wm. Little, Hon. W. C. Edwards, Professor John Macoun, J. B. Miller, W. C. J. Hall, J. F. Ellis, Gordon C. Edwards.

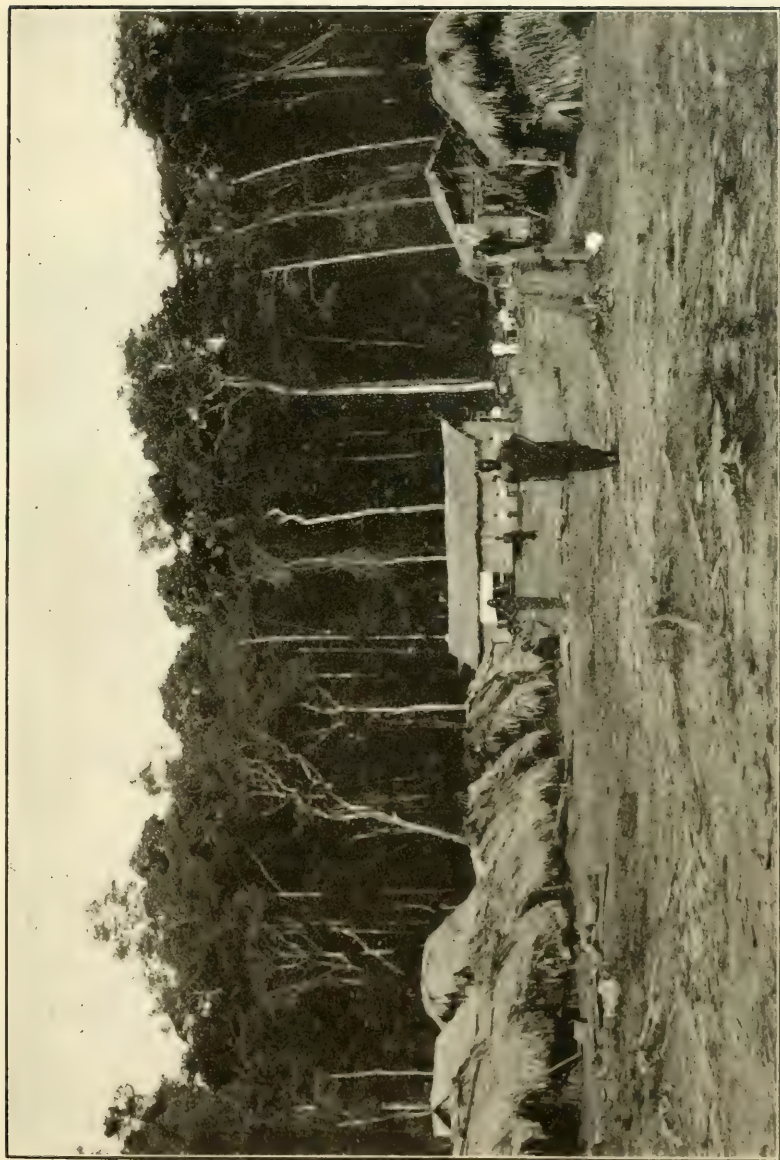
At a subsequent meeting of the Executive Committee the following Vice-Presidents were appointed:

Ontario, Hon. Nelson Monteith; Quebec, Hon. A. Turgeon; New Brunswick, Hon. F. J. Sweeney; Nova Scotia, Hon. Arthur Drysdale; Prince Edward Island, Rev. A. E. Burke; Manitoba, Hon. J. H. Agnew; Saskatchewan, His Honour A. E. Forget; Alberta, Wm. Pearce; British Columbia, His Honour Sir Henri Joly de Lotbiniere; Keewatin, His Honour the Lieutenant Governor of Manitoba; Mackenzie, F. D. Wilson; Ungava, Peter MacKenzie, Hudson's Bay Co., Montreal; Yukon, W. W. B. McInnes, Commissioner.

A committee consisting of Messrs. E. Stewart, J. M. Macoun, Roland D. Craig and R. H. Campbell was appointed to supervise the editing of the Forestry Journal pending the appointment of an editor.

A resolution appreciative of the service rendered by Miss M. Robinson of the Forestry Branch to the Forestry Convention and the Forestry Association was passed.



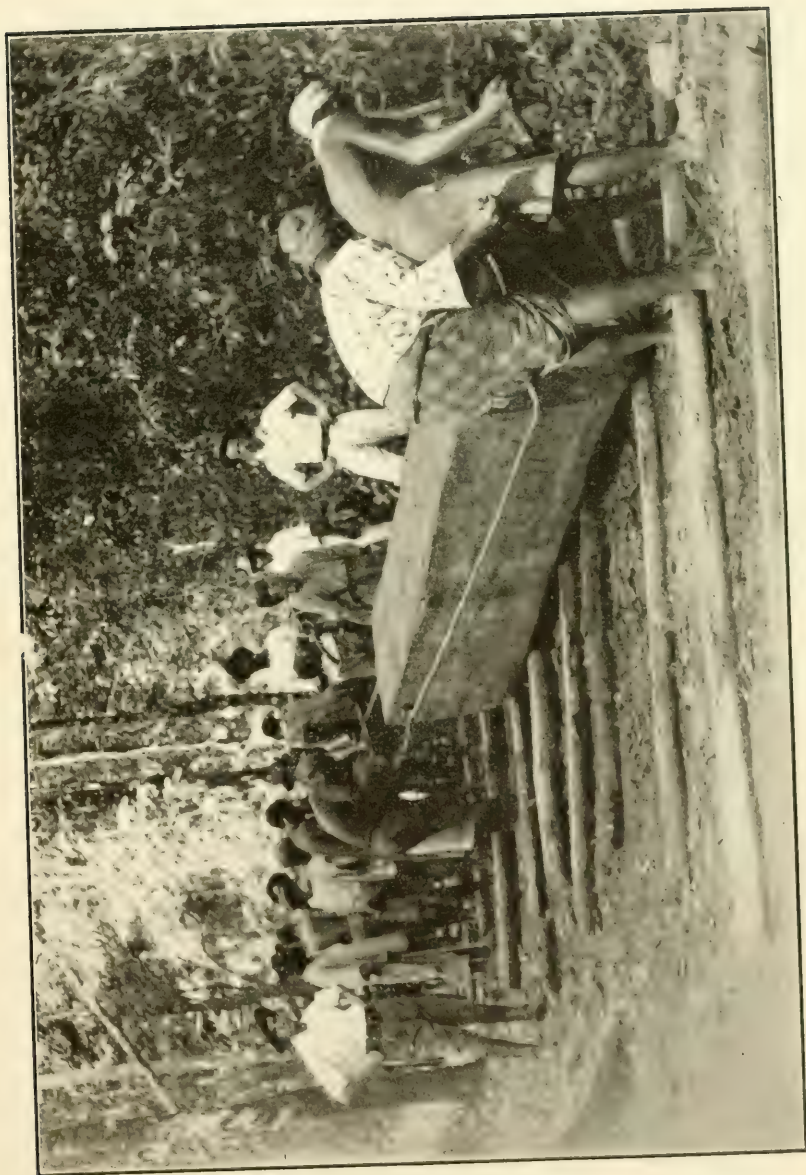


1. Paba from back. Bush with clearing in front of Manager's and Laborers' houses.

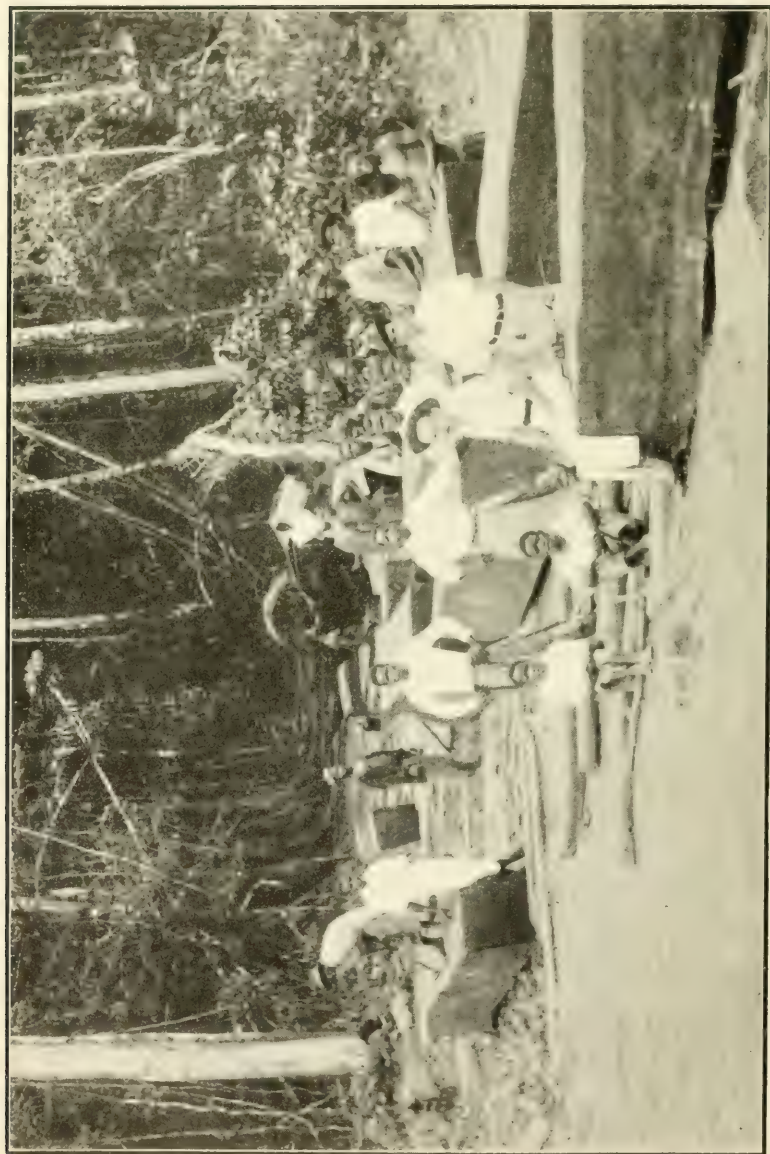


2. Bridge over Swamp, made by Puba Natives under white supervision.





8. Hauling Timber to Waterway.



4. Collecting logs previous to putting them in the water, just outside the picture.



## LOGGING IN SOUTHERN NIGERIA.

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A. HAROLD UNWIN, ASSISTANT CONSERVATOR OF FORESTS,  
BENIN CITY, SOUTH NIGERIA.

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In a previous article\* some account of the forestry and timber operations in West Africa was given. Logging in every country is a most fascinating work, both to take part in and to watch. In this tropical country the vegetation in the real forest belt is so dense that before actual felling operations can begin a large clearing is made near the river, which is to be used for floating logs. Here are native huts for the wood cutters, including a mat-roofed house for the white manager in charge. Such a view, with the typical "bush" in the background, is shewn in illustration number one.

It must be remembered, too, that in such a forest, only perhaps one tree in a hundred is a mahogany of mature growth, which makes it extremely difficult to control the varying felling parties, each under its native foreman. The trees having been felled, "roads" are made, i. e., the bush is cut up to 6 feet from the ground, and any very bad hollows filled in with small billets of wood. The whole gives the appearance of a large tunnel-like arbour. The swamps which occur at intervals have to be bridged by ramming in a number of small stakes and fastening with various vine stalks and crosspieces, making the whole a strong, though very elastic structure. Illustration number two shews one of these fully half a mile long. In crossing one, about a year ago, the writer saw a carrier go clean through, leaving his load, which he was carrying on his head, on the bridge. He was subsequently pulled out of the reeds and mud into which he had fallen.

In the ordinary bush, skids, made of small billets of very hard wood, are laid on the tracks already cut. Along these the logs are drawn by other gangs of natives. A log 4 feet square and, say, 12 feet long on an average, takes 70 or 80 "boys," as the haulers are termed, to drag it at all, and then only with pauses every now and then and continuous shouts from the foreman, and a kind of "song" from the men. When a log really gets stuck, and this is not seldom, levers are supplied at the back and a tremendous lot of "human" energy uselessly expended. It is very difficult to get natives to haul together. Illustration three, though a poser, shews this to advantage.

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\* Canadian Forestry Journal, Vol. I, pp. 173 - 175.

The ground, as is natural by its low elevation about the sea up to 200 feet, and with it a very thick layer of forest humus, is very soft, or other means of transport would be adopted. Then too, the trees are so isolated that a tramline or light railroad would not pay. In the near future, the Indian buffalo, or the indigenous elephant, it is to be hoped, will be harnessed and thus draw the 3, 4, 5, and even 6 ton logs. During a day (6 a.m. to 5 p.m.) a gang of natives manage to bring in up to 5 logs grown a distance of a mile to a mile and a half, very slow work to be sure. These are gradually collected at the waterside to be stamped before being put into the water. In the fourth picture we have such a scene, though the quantity of logs is by no means typical, as there are few there, compared to some shipping points where hundreds collect in a month. From this place they are sent down in small rafts of 5 or 10 logs, about 80 miles, where they can be made up into large rafts to go down to Koko Town, or Benin River, where the steamers pick them up before starting back on their 5,000 mile track to Great Britain.

It goes without saying that all this is very expensive, and works out at roughly 2 cents a foot, board measure, which is, of course, very high, even for Africa with its undeveloped roads. It shews again the great part which transport plays in the timber and logging industry. The freight from the West Coast to England at \$6 a ton (recently reduced from \$8 and \$7 to this figure) is about the same as from similar distances from India, Siam or other countries, for the same class of material. Nevertheless, it amounts to roughly a cent a foot. Therefore, at a market price of, say 6 cents a foot, board measure, (an average rate for 1904) transport from the forest makes up half that. Government dues of all kinds, recently fixed at nearly \$14 per ton, works out at 0.6 cts. per foot on average material, and at the price quoted form 1-10 of the cost, which is by no means high, compared to Algeria, India, Ceylon and Java. The price of the timber at 6 cts. a foot, c.i.f. Liverpool, is low, and the above rates become very favorable at a price of 12 cts. per foot, such as was obtained during 1902 and 1903.

NOVEMBER, 1905.

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We are glad to see that the British Columbia government has made an appropriation, though only \$5,000., for fighting forest fires during the ensuing year. For an adequate system of fire protection at least ten times that amount would be required, but as the value of the forests become more fully appreciated we may expect the provincial governments to make larger appropriations for their protection.

## CANADIAN FORESTRY EDUCATION.

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A. H. D. ROSS, M.A., YALE FOREST SCHOOL.

The forest has been aptly described as "the balance-wheel of nature," and the farther we look into the matter the more firmly are we convinced that this is really the case. It is the most highly organized portion of the vegetable kingdom, and its effects upon its environment are extremely important and far-reaching. By a ruthless disturbance of the "balance-wheel," the once powerful Persian Empire has been reduced to a state of pauperism. The destruction of her forests was swiftly followed by the drying up of her streams, the disappearance of her fertile fields, and the shrinkage of her vast population to something less than eight millions of people. Syria, Spain, Turkey, parts of Italy and southern France also know, to their cost, what a disturbance of nature's balance-wheel means, and if we are wise in our day and generation we will heed the teachings of history and try to profit by the sad experience of these countries, and do our utmost to preserve the proper balance between our woodlands and the areas cleared for agricultural purposes.

In all parts of the world the forest was first valued as a harbor for game. Later it was regarded as an impediment to agricultural development and relentlessly slashed and burned to get it out of the way. As good timber became scarce it was exploited in the most ruthless manner and vast areas were rendered almost worthless for the production of further crops. Both in itself and in its far-reaching effects upon mankind the forest is marvellously complex and only the most highly civilized peoples have acquired a clear conception of its relation to the future welfare of the nation. By the decay of its resources a nation may cease to exist, and whilst debating over the best methods of disposing of its wealth it may even lose its capital without ever realizing the fact. Only slowly does it seem to dawn upon the public mind that the loss of our forests without adequate restoration will be the deadliest imaginable blow to our future progress and prosperity. It is high time that war should be waged against the useless destruction and needless waste of our forest wealth, and that provision should be made for future crops of trees. A prosperous nation cannot be built up in a desert, nor on the other hand can a people continue in power and influence when the territory from which they draw their substance shall have receded into barrenness. The standing of a nation is well

measured by the distance it is able to look ahead and make provision for the future, and in Canada the time seems to have arrived for a more systematic and scientific study of the conditions of reproduction and development of our forests, so that sufficient data may be available on which to base plans of management for the future. The attention of the world, and particularly of the great republic to the south of us, is being directed to our forests which are rich with a great variety of trees and constitute one of our most important sources of wealth. But it must be remembered that wood, in one form or another, is an absolute necessity in the present stage of our civilization, that our people use enormous quantities of it, and that during the twentieth century our population is almost certain to reach the eighty million mark. Hence, it will be seen that, even with our great forest areas (much of which is of inferior quality), we must adopt a more scientific method of management if we are to make anything like adequate provision for the home consumption, and leave a fair margin for export to other countries. It is only by a general and far-reaching system, based upon an adequate, scientific and practical grasp of the whole situation in all its aspects that our people can hope to avert the evils which have overtaken other lands as a result of the disappearance of their forests. Hence, there has arisen the necessity for a class of men with a training of a highly technical nature—men thoroughly grounded in the principles of silviculture, lumbering, milling, transportation, political economy, etc., and with a clear conception of the relations of things that at first sight do not seem to be related even in the remotest degree. In other words, Canada needs schools to train foresters to undertake the proper management of her vast forests, and to prevent their ruthless destruction by fire and axe.

To the objection that there is no room for trained foresters in Canada we would reply that, some thirty years ago when President Loudon and a few other far-sighted gentlemen advocated the establishment of an Engineering School in connection with Toronto University, they were told that there was no need for it, and that such a movement simply meant the stranding of a lot of young men at the end of their courses in engineering, without hope of employment. Fifteen years later when Professor Goodwin and others advocated the establishment of a School of Mining in connection with Queen's University, they were told the same thing, and to-day there are still plenty to tell us it is perfect madness to establish a Provincial School of Forestry in Ontario, in Quebec, in New Brunswick, or anywhere else. The fact remains, however, that neither Toronto nor Queen's University can meet the demand for graduates from their technical schools. The training received in both institu-



tions is so thorough that it has created a demand for itself, and there is every reason to believe that the graduates of a first class Forestry School would be just as eagerly sought after as the graduates of our engineering and mining schools. The science of forestry includes both the theoretical and the applied portions of botany, ecology, physiography, dendrology, wood technology, silviculture, treatment of woodlands, seeding and planting, forest engineering and mapping, forest administration and law, forest protection, lumbering and transportation in all their complex relations, and forest hydrography. Whether such an extensive course of studies should be attempted in a four years' under-graduate course as it was at Cornell, and as both Queen's and Toronto Universities have proposed doing; or whether it should be made a post-graduate course for men who are university graduates in the natural sciences, as at Yale and Michigan Universities, will depend upon the degree of specialization we wish our foresters to attain.

A forester is not a mere botanist let loose to air his facts at the expense of others; neither is he a fire ranger, a lumberman, a sportsman, an arboriculturist, a dendrologist, a silviculturist, or any other ist. He must clearly understand all these phases of the question, and their relation to one another. He is constantly being called upon to deal with universal and economic questions of tremendous magnitude and importance. His profession touches life at many points, and he must of necessity be thoroughly well trained for his life work if he is to be of the highest service to the state. The state cannot afford to place such tremendously important questions as the Science of Forestry has constantly to deal with in the hands of a corps of inefficiently trained men. President Roosevelt says "The forestry problem is in many ways the most vital internal problem in the United States;" and Ex-President Cleveland says "Through the teachings of intelligent forestry it has been made plain that in our Western localities ruinous floods and exhausting droughts can be largely prevented, and productive moisture in useful degree at needed periods secured by a reasonable and discriminating preservation of our forest areas. The advocates of irrigation have been led to realize that it is useless to provide for the storage of water unless the sources of its supply (the forests) are protected; and all those who, in a disinterested way, have examined these questions concede that tree growth and natural soil on our watersheds are more valuable to the masses of our people than the foot-prints of sheep or cattle." From whatever point of view we approach the subject we cannot get away from the fact that the forestry question is one of national importance. The forester must possess a thorough knowledge of the life history of each kind of tree to be grown; the influences effecting its welfare; the methods employed in its management; the technical proper-

ties and uses of its wood, bark, gum, or other products; the removal, preparation and marketing of these products, and the various economies that may be gained by skilful operations. He must possess a knowledge of all that pertains to the growth and production of forest trees, and with this knowledge he must combine the further knowledge of how to manage a forest property so as to produce conditions that will result in the highest attainable revenue from the soil by wood-crops. His business is to grow crops of trees, AND MAKE THEM PAY. If he does not succeed in this, we are better without him. If he can succeed, and does succeed, then we should secure his services as soon as possible.

The idea that scientific foresters are purely theoretical, and of little or no use, is now pretty well exploded, even in America, and it will not be long before the science of forestry is recognized as a distinct profession here as in Europe, where much of the timber land is made to yield a yearly revenue of five dollars per acre, instead of being sold for taxes. The forester does not aim to oppose nature, but to assist her; to make use of the favourable conditions naturally existing in any given locality, and to hold in check the unfavourable ones. He exercises his skill in the selection of the most suitable species, and modifies their growth so that they will produce the most valuable timber in the shortest possible time without diminishing the value of the soil for the production of future crops. Just as the agriculturist is engaged in the production of food-crops, so the forester is engaged in the production of wood-crops. Both carry on their business for the practical purpose of a revenue; both must protect the crop from insect ravages, fungous diseases and fire; both must guard against the impoverishment of the soil, and constantly aim to increase its value. In each case the land is the principal capital, and any part of it either wholly non-productive or turned to a less profitable use than it might be represents so much wasted capital. Like other forms of capital, there is no reason why our forest wealth cannot be made to perpetually renew itself and yield ample interest from year to year without diminishing the original endowment. In addition to the growing of wood-crops for profit, the forester must consider the indirect effects of the forest on rainfall, the flow of streams, the growing of grain and fruit crops, and many other complex problems. He must cultivate a receptive attitude of mind, and endeavour to develop what may be best described as FACULTY—the rare gift of understanding the real relations of problems that at first sight do not seem to have any bearing whatever upon one another. Just as the science of botany deals with everything pertaining to vegetation, so the science of forestry has to do with everything connected with forests—EVERYTHING.

Like agriculture and mining, forestry has a scientific basis,

and when better understood will command equal attention and be recognized as a factor that enters largely into the more important economic questions of the day. Just as our agricultural colleges and experimental farms require a large number of professional men with superior technical training to teach the principles of agriculture and investigate the new problems that are constantly coming forward for solution, and just as our mining schools and our Geological Survey Department need highly trained specialists to teach us how to develop our mineral wealth, so our forestry schools and our Bureau of Forestry will be expected to employ highly trained specialists for the teaching of the principles of forestry and the investigation of its complex problems. Twenty years ago the science of forestry was regarded as an abstract and debatable theory, and all knowledge of it was confined to a few scientific experts and enthusiasts whose views were regarded as of doubtful value. To-day the most intelligent and public-spirited members of the community regard the treatment of our forest resources as a vital and urgent economic problem, and there seems to be widespread recognition of the fact that the preservation of a due proportion of the land in forest for all time is the only possible means of securing either agricultural fertility or a lasting supply of timber. The whole question is an exceedingly complex and difficult one, and calls preeminently for the exercise of the providential functions of the state to counteract the destructive tendencies of private exploitation. The state being an institution for the purpose of insuring not only our present, but our future and continued welfare must, necessarily, take an interest in the permanence of the natural resources upon which its welfare rests.

Inasmuch as the time required for a crop of trees to reach the most profitable age for cutting is so long that very few private owners can afford to adopt this branch of farming on a large scale, it can best be conducted by the state--by the people as a whole, and for the benefit of all. The experience of centuries goes to show that while the individual makes the best farmer, the state makes the better forester, and usually the only safe and good forester. This being the case it seems to be the plain duty of our legislators to make adequate provision for the training of an efficient corps of men with the technical training necessary for the proper management of our magnificent forests. Under rational management their producing capacity can be increased manifold, and a handsome revenue obtained from them. No other economic problem confronting our legislators is equal in importance to that offered by the present condition and future fate of our forests. The opportune time seems to have arrived when effective public interest in forestry education and forest preservation should be persistently aroused and stimulated.



## LETTER FROM MR. LOUIS MILLER.

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The following letter from Mr. Louis Miller, of Crieff, Scotland, submitted by Mr. F. C. Whitman, President of the Western Nova Scotia Lumbermen's Association, at the Forestry Convention, contains a criticism of Canadian lumbering methods which is frank, if not complimentary, and also shows that private enterprise is active in Nova Scotia in efforts to remedy the effects of deforestation. Mr. Miller expresses his thanks for the new Forest Fire Act, providing for a fire ranging system which has been passed in Nova Scotia and continues:

Unfortunately, however, the whole of Nova Scotia has not adopted that fire bill, but only certain portions of it, and I wish you could use your influence with the authorities to get it adopted by the whole of Nova Scotia. For instance, I have a property of about 100,000 acres of forest lands at Ingramport, at the head of St. Margaret's Bay, and the district of Nova Scotia, in which that property is situated, has not adopted the fire bill, and as I am practically a stranger in Nova Scotia and only come across for a month or two in summer, I don't know the parties to whom to apply, or I would urge them to get the whole of Nova Scotia to adopt that fire bill.

About two years ago we had a serious forest fire at Ingramport, caused by some fishermen coming out from Halifax—some of the officers of the garrison regiment there—to fish in the lakes on our property, with the result that they set fire to the forest and burnt up about 10,000 acres.

When a forest fire takes place in Nova Scotia, or any part of Canada, a crop of bushes and hardwood comes up afterwards, and the burnt ground is entirely lost for twenty or thirty years, for it is only after that time that the natural crop of spruce trees begins to come up.

I have had large experience in Sweden during the past 25 years, and I have been all over Finland and Russia. The accessible Russian forests are practically all exhausted, while those of Finland and Sweden are very nearly the same. During the past few years the Swedish people have taken alarm and started a Government system of planting over the country, which is the cheapest and probably the best I have yet come across. In Scotland it costs £2 per acre to plant young trees. In Sweden, however, they plant the seed. Wherever a forest has been destroyed by fire, or has been cut down, the Government employs a forester with about a dozen or twenty boys. The boys are





One year after planting at the Forest Nursery Station, Indian Head.



Cedar Forest along the Columbia River, B.C.



placed in a row about six feet apart, each with a small hand-iron; they take out a small hole in the ground, drop four or five seeds in it, tramp on it with the foot, and pass on, taking out holes in this way from three to six feet apart. One pound of seed plants about five acres and the seed costs one shilling per pound. In this way the Swedish forests are replanted at a cost of about 25 cents per acre. Seed thus planted grows up immediately, and I have seen Swedish forests planted a few years ago now with a young crop of trees a few feet high.

When I got the 10,000 acres burnt in Nova Scotia, I took out a ton of spruce seed from England to plant up that burnt ground, but was very much astonished to find I was charged 20% duty for importing it to Nova Scotia. I remonstrated with the Ottawa authorities, who compromised the matter by reducing the duty to 10%. I think, however, it is short-sighted policy on the part of the Canadian Government to levy a duty upon seed imported for planting up waste ground in Canada. For example, I reckon that an average acre of forest in Nova Scotia or Canada contains about 6,000 feet of timber, and the cost of cutting down, manufacturing and putting f.o.b. 1,000 feet of lumber is about \$10.; so that on every acre of forest property cut down, about \$60. has to be expended in wages disbursed in the country and which benefits the people of the country. It is therefore of very great importance to Canada to have its waste ground covered with forest, instead of lying barren, because it means employment for the people and benefit all round. I am planting up that 10,000 acres of burnt land on my property by employing about a dozen boys and doing it on the Swedish system. One man goes behind them to keep them in a straight line. A boy, as a rule, can in this way plant about five acres per day. By planting up this 10,000 acres of burnt land with spruce seed I expect in five years to have the whole ground covered with a crop of young spruce trees three to four feet high, which in 25 years, will be suitable for making pulp, and this instead of having the ground lying waste for 20 or 30 years growing hardwood bushes.

I also took over a small quantity of larch seed which I wish to experiment with on my property, but the Nova Scotia soil is suitable for spruce, and except for experimental purposes, the crop planted should be spruce.

Forest management in Nova Scotia and Canada is about the worst anywhere. In fact, there is practically none at all, and I don't think any of the Canadian or Nova Scotia lumbermen know anything at all about their forests. Some of the chief of them with whom I have conversed have never seen their forests, or at least only to a very limited extent. During the past five years I have had many forests in Nova Scotia, New Brunswick and Quebec examined with the view to purchase, only to find

the bulk of them terribly mismanaged and destroyed. I have reason to believe that the same state of matters exists everywhere in Eastern Canada, and that the forests there are much more exhausted than the Government or the people who own them themselves believe. In fact, I don't know where to find a really good forest to purchase in any part of Canada or Nova Scotia; they have all been cut down recklessly without any system at all. The easiest and best of the trees have been cut, the root cuts taken off for logs, and the great big tops allowed to lie in the forest. In fact, the forests have just been wasted and destroyed, and the Canadian Government will have to waken up immediately ere it is too late. All over Quebec and New Brunswick the big trees have been exhausted, and if the Government were to insist upon their conditions being adhered to and only those trees cut of stipulated size according to law, three-fourths of the Quebec and New Brunswick mills would have to close, because they are at present fed with under-sized trees, which, according to Canadian laws, are being illegally cut.

The Canadian Government should send young men to Germany for a year or two's study of forestry and forestry laws adopted there, their system being perhaps the best at present in existence. I think, however, that the Swedish system would be far cheaper and more suitable for Canada than probably the German system. The Germans have cheap labour and they can afford to plant young trees, but labour is dear in Canada, and the Swedish system, if adopted, would, I think, be more suitable for Canada and Nova Scotia, because it would be cheaper and could be done on a much larger scale. The German forestry laws compel proprietors to replant the ground and not to allow it to lie waste.

In fifteen years the pine in the Southern States of the United States will be exhausted; the United States will then be in desperation for lumber and will have to get its supply from Canada or the Pacific Coast. Canada will not be able to give the United States half the supply it requires, because Canada has destroyed and exhausted its accessible forests much more than people have any conception of, and the sooner Canada sets about preserving and protecting its forests and replanting the burnt ground, the better it will be for the future of the country.

I have been through the Northwest of Canada as far as the Pacific Coast, all through Manitoba on to Vancouver, and am of the opinion that Canada requires all its Eastern forests to supply the plains of Manitoba and the Northwest with the necessary lumber, during the next twenty to thirty years. I have been all over Quebec and New Brunswick, and everywhere I have gone to examine forests, I have found them depleted and exhausted, and especially in Quebec, no sooner is a forest cut down than a



fire sweeps up everything remaining; the damage by fire there is something enormous and a system of replanting the burnt ground should be immediately adopted all over Canada.

My experience of Nova Scotia is that an average or fairly good forest will give a growth of about 5% per annum—in other words, I reckon our property at Ingramport, Nova Scotia, to contain about 6,000 feet per acre of growing trees on an average over the whole ground. I don't mean 6,000 feet of big trees ready for cutting, but of all sizes of trees from perhaps the thickness of your arm upwards. On 100,000 acres this means 600 million feet, 5% growth on which would be something like 30 million feet per annum. Of course, the small trees are growing even more rapidly than the big ones. If any one were to cut down the big trees on this ground, there would not probably be more than half this quantity available of big timber suitable for deals, but the small growing timber is, in my opinion, quite as valuable as the big timber, because it is growing rapidly every year, and it takes the place of the big timber. Of course, lumbermen ignore the future, and look only to where they can get sufficient big trees every year as big as possible to feed their mills, and in a matter of five to ten years Nova Scotia will be practically exhausted, except a very few properties. The same remarks apply to Eastern Canada. Of course, there are large forests away north from Lake St. John and north in the direction of Hudson's Bay, but they are inaccessible, and the cost of getting them out is far too great at present, and what we have to deal with are the Eastern Canadian forests already opened up, and which, in my opinion, will be exhausted in ten to fifteen years unless some system is adopted by the Government of replanting on an extensive scale, and the only way to do that properly is to send men to Germany to study the German methods and also to study the system of planting adopted in Sweden and to have a system introduced into Canada which will benefit a future generation as well as the country.

On the 10,000 acres of burnt ground on my property, I have cut down all the trees, large and small, and have made the burnt trees into lumber to get the ground properly cleared up so that I can replant it immediately, and during the past two years I have been occupied at that. By the end of next year I hope to be finished with it, and then I propose to thin out the forest systematically year by year, as we do in Sweden, that is, to take a certain section of the forest each year and cut out the big trees carefully and to branch out these big trees to three or four inches at the small end, so that the branches may fall down on the ground and disappear quickly, and to log out these trees to about five or six inches at the top end and clear up the forest properly, instead of the system at present in vogue of cutting down a big tree and only taking off a root log and allowing 30 or 40 or 50 feet of the top

part of the tree to lie in a great big bunch with the branches all on it, which just means a temptation for a big forest fire, and a great waste of lumber. By taking say a certain section each year of 1,000 acres or more and thinning out the big trees, and cutting over the whole forest in this way, systematically, as we do in Sweden, the result is that in 20 years the forest that has previously been cut over and which has had the light let into it, is in a better condition than ever.

The big Swedish sawmill owners, as a rule, own sufficient forests to feed their mills for the future by cutting only what they estimate to be the yearly growth, and by going through the forest systematically section by section every 20 years or so and thinning out the big trees only in such a careful way that the forest is not destroyed and that fire is not encouraged. If the same system could be adopted in Canada it would be a great future boon to the country.

Norway and Sweden have practically for the past fifty to sixty years supplied the world with lumber, but now their forests are practically exhausted and their production will go down rapidly in the future, and the demand upon Canadian forests, both for Great Britain and the United States, will, in the future, be greater than ever. No system has been adopted by the Canadians of protecting and replenishing their forests for the future, and the result will be that the Canadian forests in ten or fifteen years will be entirely depleted and exhausted, unless the Government immediately wakens up.

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That Newfoundland is becoming interested in the preservation of her forests is shown by the following extract from the speech from the throne delivered recently:

"Fully apprehending the importance of our forest's wealth and its relation to the fisheries and other industries, my ministers have decided to create additional forest reserves, and while permitting legitimate lumbering operations in such localities as may seem expedient, to prevent the erection of sawmills upon such lands as are reserved in the public interest. A Bill dealing with this matter will be submitted for your consideration."

## HOW SHALL FORESTS BE TAXED?\*

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EXTRACTS FROM A PAPER READ BEFORE THE SOCIETY OF AMERICAN FORESTERS BY ALFRED GASKILL, FOREST INSPECTOR,  
UNITED STATES FOREST SERVICE.

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The question of how forest lands should be taxed is a most important one, and while the systems of forest taxation in the United States are in some respects very different from our own, just as our systems vary in the several provinces, the general principles underlying the systems of the two countries are nearly enough alike to make these extracts from Mr. Gaskill's paper of interest to Canadians. That inequitable taxation is responsible for much forest destruction is the claim made in the first part of the paper and all the extracts here given deal with this aspect of the question.

"No other question concerning the woodlands of the country, save that of fires is so important, and we shall make little substantial progress in the effort to induce private owners to maintain their forests until the present condition shall have been relieved and the forests be so rated that they shall bear no more than their fair share of the cost of government . . . . In all the older states, those wherein lumbering has greatly enhanced timber values, the tax levied upon standing timber is often a warning to the owner that he must cut it or run the risk of great loss, and when he has cut it the bare land is taxed so high that he is forced to abandon it.

"A few attempts to correct the evil, through partial exemption, rebates or bounties have been made. But, though such measures may serve for a beginning, the real need is for laws that, recognizing the public utility of forests, adjust the necessary tax levies to the facts and conditions that govern tree growth, and to the long periods of time that are required to produce timber.

"In general, it is assumed that taxes are imposed for the protection of persons and property, as well as for public necessities, yet rarely is the obligation extended to woodlands. The forest is not only allowed to go unguarded, but everyone may tramp and camp therein and do almost what harm he will. The common law and statutes relating to forest depredations are notoriously disregarded, and, though the conditions in some parts of the country have been bettered of late years, private forest and public suffers much damage from careless and malicious sojourners.

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\* See paper on "Woodland Taxation" by Dr. J. F. Clarke in "Canadian Forestry Journal" for October, 1905.

"Under the common practice of intrusting to local officers the levying of taxes upon real estate, forests are assessed, almost without exception, on the basis of agricultural land; that is, the land is estimated to have a certain value if cleared, and the standing timber is worth so much more, or is viewed as an incumbrance. The latter case is by no means rare in hardwood sections. In many instances, perhaps in most, the assessment is fair so far as the value of the property is concerned. In many others it is far too high, because the land is not fit for farming, and therefore valueless, except to grow trees. At the same time, the timber often has only a potential value, since it can not be marketed for want of roads or some other temporary unreadiness. The argument is entirely apart from the admitted inability of many of the assessors to truly value woodlands, and who therefore resort to guessing, and from the quite general belief that in cases where the owner is a corporation or a non-resident with no local interests, the property may be taxed to the limit. These things are not to be avoided under any system. In short, whether the assessment be made fairly or unfairly, the forest is considered a form of property which should be realized on at the earliest possible moment and the more it can be made to yield to the county, prior to its extinction, the better for the county.

"One can easily understand the temptation that confronts the assessors in regions where everything is wanted—roads, schools, public buildings—to use the taxing power for present advantage, yet instances are plenty of communities established on the returns from forest property and utterly abandoned as soon as the original timber was all cut. The few farms that had been taken could not keep up the roads and other public works.

"But the wisdom or unwisdom of raising a revenue once for all upon forests is only a small part of the question. The forest land is not farm land uncleared, and a forest is not the crop of a season. The problem concerns itself chiefly with those areas which in their nature are fit only for tree growth, and with a crop representing the accumulated investment of the owner for as many years as were required to bring the trees to maturity. If a man buy a mature forest, he acquires the investment of another; if he plants or waits for a natural one to grow, he gets no return for many years. In either case, his forest serves the public by providing a common necessity—wood—and by the beneficent influences that it gives freely.

"These considerations make it apparent that the forests occupy, or should occupy, a separate place on the tax list; that they need to be treated differently from farms and town lots and mines. In fact, it will be necessary to show that growing trees should be considered personal property, not real estate, as they are now by practice or by law in virtually every state in the Union.



## FOREST FIRES IN BRITISH COLUMBIA.

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Mr. J. R. Anderson, Deputy Minister of Agriculture for British Columbia, has again furnished the Association with a detailed report on the fires that occurred in British Columbia last season, with a partial estimate of the value of the forests destroyed. Though the season was very dry in some parts of the province, the destruction of forests by fire was, on the whole, not great when the great extent of the province is taken into consideration. Railway locomotives are a constant menace to the forests through which they pass and as there is apparently some difficulty in punishing the offenders under the Act now in force, it is hoped that it will be so amended that railway companies may be compelled to take better precautions and be made liable for the full amount of the loss caused by the negligence of their servants.

The comparatively small number of fires last season was due in part to a better observance of the Bush Fire notices posted everywhere. These notices have made everyone familiar with the laws relative to forest fires and prospectors and miners, as well as ranchers and settlers, are acquiring the habit of putting out their camp fires, instead of leaving them to smoulder. More care is also taken by those clearing up land to prevent fire from spreading to the adjoining forest. The preventive measures taken by fire wardens and their promptness in dealing with fires have done much to restrict the loss from this cause.

There are few seasons in which there is not a considerable destruction of valuable forest by fire on Vancouver Island, but 1905 was a notable exception. In Cumberland District there were no fires, the greater care taken by settlers and the heavy rains of July and September being the cause. In Cowichan the only fire reported was a small one up the Koksilah River, on the lands of the Victoria Lumber Manufacturing Co. The fires in this district are as a rule attributed to prospectors. The agent at Alberni, where there were no fires, thinks that the best preventive measure is to warn the public just before and during the dry season. In Alberni District East, which includes all that portion of the district lying east of the head of Cameron Lake, as well as Lasqueti and Texada islands, there were no fires. The agent says: "This portion of the district has been entirely free from bush fires this season and as the Bush Fire notices were posted up all over the district before the dry weather set in, I think it has had the effect of making campers and others more careful in

setting out fires." The agent for Nanaimo District gives the same reason for there being no fires there. In the Newcastle District there was but one fire which was about 12 miles back of Ladysmith. It burned over a part of the ground that had been logged by the Victoria Lumber Co. in 1904, but it did little or no damage to standing timber.

On the mainland there were many fires in some districts, but none that destroyed a very wide extent of forest. For the Grand Forks District the agent reports: "Forest fires prevailed mostly in the latter part of July and up to the rainy weather in the beginning of September; they were not so destructive as those of the previous year on account of the breaks formed by the fires of the year before. The timber destroyed was mostly young, and consequently of small size. The most frequent origin of fires in this locality was the engines of the various railway lines, and as under the Act of last year there seems to be a difficulty in bringing a railway company to book they go merrily on with their destruction. Some of the fires were started by the Kootenay Power line-men, but after they had been given to understand that they would get into trouble, that source ceased. The estimate of loss by fires might be placed at about \$5,000."

In the Greenwood District, the first serious fire seemed to start in the Boundary Creek Valley near Anaconda. A few men were employed to prevent it from spreading, and at the same time protect the wagon-road bridges and culverts. In this they were to some extent successful, but soon a number of other fires were noticed in the mountains which quickly spread over a large area—about 10 square miles—which was particularly dry, owing to a long, hot summer and lack of rain. The police endeavored to trace the origin of the fires, but were unsuccessful.

The exceptional heat and dryness of the summer was generally thought to be the cause of the unusual number of forest fires in the Kootenay District where they caused more damage than for several years past. As the greater portion of the district is unsettled, it is impossible to arrive at any accurate estimate of the loss of timber, though it must have been considerable. Fires caused the destruction of government roads and bridges in this district to the extent of \$3,000. The efforts of the fire warden doubtless reduced the threatened fire losses. A system of supervision is recommended by the agent which will permit of officers getting early to the fire, and it is suggested that provincial police officers be authorized to make expenditures up to \$25, without waiting for special authority.

There were a good many small fires in the Okanagan District, but only one—near Peachland—that caused much destruction. In most cases the causes of their origin were investigated by the police, and there were several prosecutions. The agent there

reports a marked improvement in public sentiment in recent years, regarding the prevention of fires and thinks that the best preventive measure is a full investigation of the cause of every fire reported and the prosecution of the offenders when detected.

In the Upper Fraser country there were few fires, and none of them very destructive. The summer was unusually dry and warm in the Barkerville District, though almost continuous rains prevailed in the Clinton District. In the lower part of the Barkerville District, along the Fraser River, a fire started in July and ran a few miles through a sparsely wooded country, but was extinguished by the settlers before much damage had been done. About the same time a fire started in the Quesnel Section of the same district, a short distance from the town of Quesnel Forks, but was quickly got under control by the prompt action of the government agent at that place who engaged a number of men to fight the fire, which was put out with but trifling loss. About Lillooet there were three or four bush fires which covered an area of but a few acres. The rainfall was heavy and frequent.

Although the early part of the summer was one of the hottest and driest on record in the Nicola District, the destruction of forest by fire was very small. The agent reports that recent years show that increased care is being taken to extinguish fires.

The only fire near Port Simpson was one in the neighborhood of Lorne Creek, which was started by lightning. The area burned consisted mainly of small spruce, birch and poplar, of little or no commercial value.

All the government agents were asked to state the causes of fires, so far as known, and to suggest remedies. Their replies are naturally somewhat similar and only a few of them have been quoted in the preceding paragraphs. The agent at Nicola makes a suggestion that seems well worth acting upon. It is that a special effort should be made to interest the Indians in forest preservation. A circular addressed to all the chiefs could not fail to cause the matter to be discussed in their councils and if in the different sections one reliable Indian, at least, were appointed with instructions to act promptly when a fire started and even given some authority to take preventive action much loss might be avoided. Ignorance and carelessness on the part of the Indians doubtless cause many fires, but it should not be very difficult to teach him to be more careful.

## \*SCOPE AND USE OF ARBOR DAY.

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### SUGGESTIONS FOR MAKING THE PLANTING OF TREES BY SCHOOL CHILDREN AN EXERCISE IN FOREST WORK.

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Arbor Day was instituted in Nebraska in 1872 by Hon. J. Sterling Morton, afterwards Secretary of Agriculture, and has since made its way from State to State until provision for its observance exists in almost every State and Territory.

The central idea of Arbor Day is the intelligent and appreciative planting of trees by school children. The planting is usually accompanied by exercises, which are intended to impress upon the children the beauty and usefulness of trees and thus to lend to the work the value of a bit of nature study. Arbor Day has undoubtedly done much to inculcate a love of trees, and has given added impetus to the general movement for the better knowledge and the wiser use of forests.

Yet there is no question that Arbor Day can be made more practical than it has been; that it can be brought into closer touch with forestry by being made the opportunity for carrying out simple steps in forest work. The permanent results of Arbor Day from the standpoint of successful planting have frequently been disappointing. Too often species entirely unsuited for either economic or ornamental planting have been used. Still more common causes of failure have been the lack of sufficient care in doing the work, and neglect of the trees after they are planted. In this way much of the educational value of the work is lost. By leaving the trees unprotected from animals, insects, and other destructive agencies the intended good example is turned, for want of a little care, into a negative one.

But even when the planting has been well conceived and wisely carried out, there is often lacking, in work of this nature, all reference to the larger aspect of forest planting. The ultimate aim of the day might well be to prompt and encourage not so much a sentiment for trees as a sentiment for the forest. Yet the practice has been to plant individual trees rather than groves, and the relation of the single tree to the forest has not been pointed out. Talks on Arbor Day have not dwelt enough upon the economic side of forestry, or have tended to give a wrong impression of the whole subject by lamenting all cutting of trees.

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\* U. S. Dept. of Agriculture, Forest Service Press Bulletin, No. 123.



The effect of this has been actually opposed to the forester's teachings.

Arbor Day is the time for disseminating sound, practical knowledge regarding forestry in its broader aspect. The mere act of setting a few trees, without reference to the commercial utility and the protective value of forests, is but a small part of the work of the day.

The proper season for planting is not everywhere the same. South of the thirty-seventh parallel, especially in the more humid regions, fall planting is perhaps preferable, but north of this the winter comes on so quickly that the trees have scarcely time to develop roots strong enough to support them until spring, and spring planting is therefore more advisable. The right time to plant in spring is when the ground has ceased to freeze and before budding begins. Evergreens may be planted somewhat later than hardwoods. The day to plant is almost as important as the season. Sunny, windy weather is very unfavorable; cool, damp days are the best. For this reason it is well to leave the date for Arbor Day unfixed, so that the best opportunity may be chosen. Such exercises as are desired can follow when the planting is done.

The careful selection of trees for a specific use and situation is essential to success, and proper planting is equally important. Though less fastidious than agricultural crops in their demands upon the soil, trees can not be set in a rough soil at random and then expected to flourish. They should be planted without allowing their roots time to dry out from exposure to the air. When delay between procuring the trees and their planting cannot be avoided, the roots must be kept moist by standing them in a "puddle" made of earth and water mixed to the consistency of cream, or "heeled-in" by nearly burying them in fresh earth. In setting the trees it is important to place them about three inches deeper than they stood originally, and to spread out the roots and pack the soil firmly about them. Two inches of soil at the top should be left very loose, to act as a mulch to retain the moisture.

Large trees are by no means always the best to plant. Small seedlings may be secured easily and cheaply, and are much more likely to live. If these are set out in good numbers after the pattern of a commercial plantation they will become in due time a true forest on a small scale.

If only a few trees are planted, as is usually the case, it is still possible to make plain the true relation of such work to forestry. No matter how few the trees, they may be made to illustrate planting for commercial or protective use.

The scope of Arbor Day planting may be sometimes broadened by securing permission from some public-spirited citizen or

nearby farmer for the children to plant a small block of trees on his land. This could be made a practical demonstration of how such work is done on a large scale.

Outside the scope of the actual planting, it is well to bear in mind that Arbor Day is not the only day on which trees deserve the intelligent thought of the children. They need care throughout the season. Watching the plantation thrive under right treatment greatly adds to the educational value of the work, which otherwise leaves but a slight impression.

It is all-important that the plantation should become a model of what can be done along these lines. In after years the children should be able to point with satisfaction to the work of their school days.

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A bill of great importance to the forest interests of New Brunswick was introduced by Hon. Mr. Tweedie, which provides for the appointment of a sub-committee of the Executive Council to act with the Surveyor-General in the carrying out of the provisions of the act and authorizes them to employ the necessary number of competent men who will be charged with the following duties:—

(a) To make a complete survey of the Crown timber lands of the Province and to divide the same into districts.

(b) To classify such lands and make a thorough and exhaustive report on the same.

(d) To describe as minutely as possible the character, quality, rate of growth and accessibility of the timber in each district.

(c) To distinguish lands fit for agriculture from forest lands and to subdivide the former into one hundred acre lots.

(e) To report on the value of timber lands now under license.

The Lieutenant-Governor in Council is authorized to reserve from settlement or from license Crown timber lands at or near the head waters of rivers to such an extent as may be deemed advisable to preserve and protect the water supply, and to make regulations against forest fires and for the general administration of the Crown timber lands.

The bill also authorizes the Lieutenant-Governor in Council to make regulations governing the charges of boom companies for log driving.

## THE WESTERN HORTICULTURAL SOCIETY ENDORSES WORK OF FORESTRY CONVENTION.

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The Secretary of the Western Horticultural Society has forwarded from Winnipeg a copy of the resolutions passed at the recent convention of the Society. The members of the Canadian Forestry Association will be delighted to know of the great interest taken in the west in everything pertaining to the preservation of forest lands.

The resolutions are:—

“RESOLVED, that the Western Horticultural Society, having more than 200 members resident throughout the three central provinces of Central Western Canada, in annual convention assembled, heartily endorses the action of the Premier of Canada in calling the recent Forestry Convention at Ottawa, and that this Society is in full accord with the resolutions passed at said convention, and

“RESOLVED, that in the opinion of this Society, the forest reserves now existing in Western Canada by order-in-council should be immediately made permanent by legislation, and that the most stringent regulations be enforced to protect these reserves from fire, including the acquirement of the right of any settlers therein, where their presence may endanger forests, and

“RESOLVED, that in view of the rapid settlement of the country, an immediate topographical survey should be made of the forest areas bordering on or situated within the prairie districts with a view to setting aside further forest areas as permanent reserves, and

“RESOLVED, that in view of the great destruction caused to the forest areas dotting the prairie districts in many parts of the country by prairie fire, that any restrictions upon the railways looking to the prevention of fires caused by locomotives, etc., should be made to apply to the prairie country also, so far as it is within the jurisdiction of the federal authorities. The destruction of timber within the prairie country by fires has been proportionately as great as in the wood districts of the eastern provinces, as witness the enormous destruction wrought in the Turtle and Moose mountains and other timber areas within the prairie area. An effort should be made to restore and maintain these forests, even to the extent, if necessary, of acquiring the rights of settlers therein, and

"RESOLVED, that this Society hears with pleasure of the reported acquirement by the Federal Government, of railway woodlands in Northern Manitoba, with the object of conserving our valuable northern forests. Large areas of these northern forests should undoubtedly be maintained for all time as forest reserves, and

"RESOLVED, that this Society endorses the plan of tree distribution in the west as carried out by the Department of Interior and would advise a continuation of the same within reasonable limits as to the varieties distributed, so as to cause as little injury as possible to our important home nursery interest, an interest which has done a great work in encouraging horticulture and forestry throughout our prairie regions; also, that special attention be given to the planting of trees on government lands in the prairie provinces which are not suited for general settlement."

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The past month has been unusually dry and warm in the Northwestern Provinces and as a result the Dominion Forest Fire Rangers were called out earlier than usual.

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Reports received at the Forestry Office, in Ottawa, record numerous fires as having been started. Generally, they have originated on the prairie, but in some cases have, notwithstanding the efforts of the rangers, assisted by the settlers, spread into the timber. In the southern part of the Spruce Woods Forest Reserve, in Manitoba, it is feared considerable damage has been done to the young timber and in the foot-hills of the Rocky Mountains along the valley of the Red Deer River a large fire was fought for a week. Something like six miles of trench was dug, from which back firing was done, making a fire break around the timbers. Notwithstanding this, a strong wind sprang up and the fire leaped over this guard, got into the timber and destroyed a small sawmill which was operating there. It was feared that another larger mill with some 400,000 feet of lumber would also be destroyed, but was saved by very hard and continuous work. It is to be hoped that the dry and warm weather that has prevailed in Alberta and Saskatchewan ever since the spring set in may soon change or serious consequences will result, both to those interested in the forests and in agriculture.

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We notice a very strong popular demand for government control of water powers. If we wish to protect the power for the use of the people, we shall have to start at the source and withhold from private control the watersheds from which the supply of water comes.





Measuring the rate of growth of Aspen in the Turtle Mountain Forest Reserve.



## TURTLE MOUNTAIN FOREST RESERVE.

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ROLAND D. CRAIG, F.E.

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During the past summer the Forestry Branch made an examination of the Turtle Mountain Forest Reserve in southern Manitoba, with a view to obtaining definite information as to the condition of the present stand, the possibilities of timber production and the steps necessary for the protection of the forests growing thereon.

The Reserve covers 69,920 acres of rough, hilly, and sloughy country in Township 1, Ranges 19, 20, 21 and 22, and as is almost always the case in the middle West where there are hills or water you will find timber, as a result of these natural fire breaks protecting the trees from the fires which sweep over the prairie. The general elevation is only 300 to 500 feet above the surrounding prairie. Lakes and sloughs cover about 15,000 acres, leaving 55,000 acres of timber producing land. As a glance at the accompanying map will show, the country to the north and east is watered by many streams which rise in these hills. Some of these form the head-waters of the Pembina and Whitemud rivers, but a number of others lose themselves on the prairie.

The mature stand is composed of aspen, 43%; balm of Gilead, 14%; white birch, 21%; scrub oak, 9%; ash, 8%; elm, 5% and an occasional Manitoba maple. There was originally a much larger proportion of oak, but the demand for oak logs and posts has been so great that now very little remains.

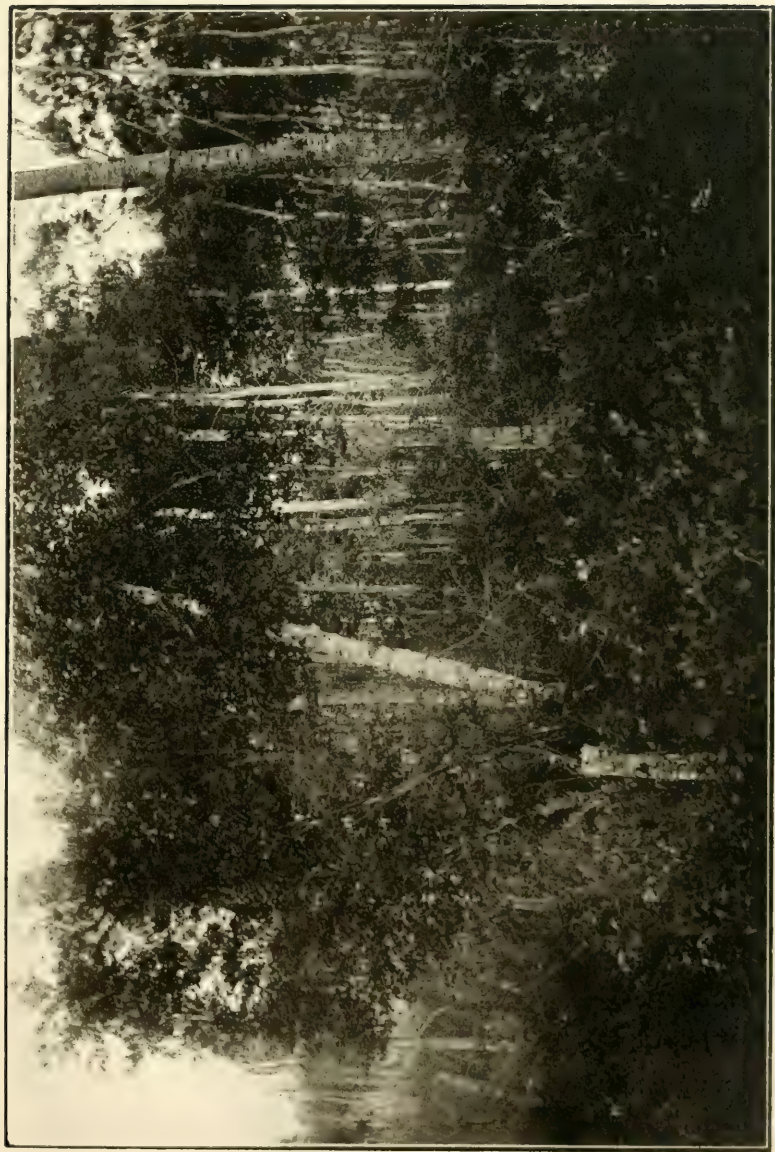
Since the advent of the settler fires have been so frequent and so destructive that now only 1,600 acres remain uninjured; on 6,400 acres the forest has been partially destroyed and the remainder is devoid of large timber, but is covered with a dense reproduction which if protected from further fires will in a few years produce even a better stand than the original.

Several small sawmills have in the past operated in these forests, but at present only one is left and it takes only a small number of logs for a very limited local trade. The day of the log buildings is past in that region, so that now the main uses of the reserve are to supply fuel and fence material, to protect the watershed, to harbor game, to serve as a pleasure and health resort, and for its general ameliorating effect upon the climate.

Farmers living within a radius of 50 miles come to the Reserve every year for their supplies of wood and during the last







Aspen and Birch on the Turtle Mountain Forest Reserve.



three years an average of 425 permits have annually been granted to settlers, who have taken out 4,900 cords of fuel, 25,000 b. ft. of logs, 3,350 fence posts, 715 roof poles and 200 fence rails. As private land outside the Reserve becomes cleared and the population increases, the demand on the Reserve timber will become greater.

The present stand contains approximately 75,000 cords of green wood and 60,000 cords of dry wood, fit for fuel. About 1,333,000 b. ft. of saw material could be cut from the green wood. Though the amount of mature timber is small, there is a most excellent reproduction throughout the Reserve, which, from the standpoint of the forester, is the most important part of the stand. On account of their ability to throw up suckers, the aspen and balsam reproduce more readily than the other species and form respectively 69% and 12% of the reproduction.

From the data collected this summer the following table gives a conservative estimate of what may be expected from the dense stands of reproduction now one to twenty years old.

Age	No. trees per acre	Av. dia. Bk. inches	Av. height feet	Av. volume cubic feet	Yield per acre-cords
10	4,000	1.5	13.5	.1	4
20	2,500	3.2	28.0	.8	22
30	1,200	4.7	38.0	2.4	32
40	850	6.0	46.5	4.3	41
50	625	7.2	51.0	6.8	47
60	425	8.7	54.0	11.1	52
70	335	10.1	56.5	14.0	55
80	300	11.1	58.0	17.4	58

With a rotation of forty to fifty years, which would be sufficient for fuel production, an annual cut of one cord per acre or 55,000 cords could be made without reducing the capital stock. This amount would supply a farming area of over 2,000 square miles with fuel and fence material.

This supply of wood in the midst of a bare prairie country is of great value to the settlers and there is no reason why, if protected from fire and indiscriminate cutting, there should not be sufficient timber produced on the area now reserved to supply the local demand for all time to come.

In a plan of fire protection the first requisite is a system of trails which will enable the ranger to thoroughly patrol the Reserve and to quickly get to a fire. At present the greater part of the Reserve is inaccessible in summer. These trails will also act as fire guards and will often prevent the spread of fires before they reach large dimensions. Outfits of fire fighting tools should be kept at two or three convenient places ready for use. It is

impossible for a single ranger to notice every fire when it first starts, for he may be in a distant part of the Reserve, but there are along the edge of the bush farmers who could be appointed fire guardians, and whose duty it would be to report fires to the ranger as soon as noticed, and to take such steps as are necessary to put them out. Three or four of such men would greatly assist the ranger in protecting the forests. The fire guardians and the ranger should be supplied with telephone communication with Boissevain, the nearest town, so that fires can be promptly reported and assistance procured if necessary. By comparing the direction of the smoke from the various stations a fire could be readily located.

Placing the value of the wood at the low figure of \$1.00 per cord, the annual revenue of the Reserve would be \$55,000.00, which justifies considerable expenditure for protecting and improvement. There is no reason now when the pioneer days of the country are past that the farmers should not pay for their wood, at least enough to make the Reserve self-sustaining. In this way the expense of administration would be borne by those who are benefited by it and they would be more directly interested in having the forests protected.

There are within the Reserve a number of squatters who settled there in direct defiance of government orders, and have therefore no rights beyond those of any law breaker. These men are a constant menace to the forest, directly by the fires which they frequently set and by grazing large numbers of cattle in the young forests, and indirectly by encouraging trespass. There should be as little delay as possible in removing these objectionable and dangerous settlers.

As a summer resort, the Turtle Mountains are becoming very attractive, and as the timber grows the beauty of the country will greatly increase. Picturesque lakes abound, and in some of them there is good pickerel fishing. On the United States side bass have been introduced with good success, and the example is worthy of imitation. Large game is not plentiful, but there are some jumping deer which, if protected, would soon increase in numbers.

This Reserve, though not large, is of immense value to the surrounding country, and as the land is not at all suitable for agriculture it should on no account be opened for settlement, or the timber allowed to be destroyed.



## NOTES.

The "Indian Forester" has for its leading article in a recent issue an editorial on "Forestry in Canada" in which the work of the Forestry Department and Forestry Association is written of in terms of the highest praise. The tone of the article may be judged from its opening paragraph:

"Among the British Dependencies which are now paying serious attention to the future adequate protection of their forests, Canada may be said to take a foremost rank. For many years the destruction of the vast forests existing in the colony had been carried on unchecked and this reckless over-cutting has within the last few years attracted the attention of all thoughtful statesmen and others interested in the future well-being of the Dominion. It became increasingly obvious that if some steps were not taken to put a stop to the existing state of affairs irreparable damage would result, both climatically and financially, to the country. Opinions were also freely stated in the home markets that it would be but a matter of a few years for the supply of Canadian-grown timber to give out, even in spite of the fact that 75% of the Dominion is under forest. This being the state of affairs the forestry movement will be welcomed alike by statesman, financier and merchant."

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The Minister of the Interior has introduced an important Bill in the Commons which, if passed, will set aside some seventy Forest and Game Reserves on Dominion Lands within the Provinces of Manitoba, Saskatchewan and Alberta and in the Railway Belt in British Columbia.

The lands proposed to be set aside are *non-agricultural* but suited for a permanent production of timber. They are situated at the sources of water supply so necessary in every district but especially so in a country like our prairie provinces where the precipitation is scant and where under the most favorable conditions summer droughts are always feared.

It is not the intention to prohibit the cutting of mature timber on these reserves but rather to place these to their highest use for the production of timber and with this object in view a rational system of cutting will have to be enforced and care taken that fire does not follow such cutting as has been the general rule in the cut over lumber districts in the past. Prospecting and mining will be allowed under special regulations.

Grazing will be permitted only to such an extent as not to interfere with the growth of the young trees.

Regulations will be enforced to protect the animals, birds and fish on the reserves.

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A meeting of the Executive Committee of the Canadian Forestry Association was held on the 27th of April to consider the summer meeting and the appointment of an editor for the Forestry Journal. As the Committee were not in a position to make the appointment of a permanent editor, Mr. J. M. Macoun was appointed temporarily, and the editorial committee, previously elected, were continued as an advisory committee.

It was decided that, although final word as to rates had not been received from the railway companies, sufficient information was available to justify confirming the acceptance of the invitation of the British Columbia Lumbermen's Association for a summer meeting in Vancouver, in September. Messrs. E. G. Joly de Lotbiniere, Thos. Southworth, Gordon C. Edwards, Revd. A. E. Burke, G. Spring-Rice, Roland D. Craig and R. H. Campbell, were appointed a committee to carry out the arrangements.

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One of the most beautiful of our forest trees is the Tulip-tree (*Liriodendron tulipifera*) which is found growing wild in many places in southwestern Ontario. Its name is derived from its large tulip-like flowers and wherever it grows it is real addition to the beauty of the region and has besides great economic value. It is not probable that the Tulip-tree can be successfully grown north and east of Kingston but anywhere between Kingston and Detroit and on almost any kind of soil it should thrive. Propagation should be entirely by seeds and these should be sown thickly in a bed of light, rich, sandy soil. Of the possibility and uses of this tree "Forestry and Irrigation" says:

"For shade and ornament the Tulip-tree possesses great merit and is deserving of very general propagation. \* \* \* Forest planting of the Tulip-tree for economic purposes has never been attempted, but judging from the form and rate of growth of the natural forest-grown tree, and the value of the wood, few trees would be more profitable for such a purpose."

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Mr. E. Stewart, Dominion Superintendent of Forestry will leave for the west about the middle of May.

It is Mr. Stewart's intention to visit a considerable portion of the afforested area of the western provinces before returning and he will probably make a trip down the Mackenzie river.

## HISTORY OF THE LUMBER INDUSTRY OF AMERICA.\*

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“To the memory of men of brain and brawn who hewed out of the forests of the New World room for Civilization, and to the men of to-day who are making the American Lumber Industry an agent of commercial progress at home and abroad, this work is dedicated.”

It is now pretty well understood by all students of the subject that the success of a nation in almost any part of the world depends upon the maintenance of a due proportion of forest, for the forest not merely distributes water in the soil, but regulates the precipitation which is necessary for the proper cleansing of the atmosphere. More than this, modern industries depend, to a far greater extent than has hitherto been generally understood, upon a due supply of timber for the thousand and one uses to which wood is put by civilized man. In a word, the life of a nation is largely the life of its forests. Yet, strangely enough, this fact has never been sufficiently recognized by the historian, and the consequence is that those who seek to follow the life history of many nations are reduced to collating the gossip of the court or the official records of battles when, in fact, the real sources of the actions which they record lie far back in the treatment by the people of their forests and forest wealth. The cutting off of the forest has turned many a place into a desert, making it necessary for its inhabitants to move on and possess the land of some less wasteful people, and so have come those intrigues and wars the minutiae of which are so faithfully recorded by the writers of history. It seems strange that the original facts have been so generally omitted by the historians that it is almost impossible—even in the case of those nations whose rise and subsequent downfall have clearly followed the wilful waste and afterwards woeful want of their forests—to trace back to their cause even effects so marked and, in the end, so disastrous. Even in America, whose chief attraction from its earliest settlement has been its forest resources, the historian seems not only to have failed to collect material easily available, but to have been almost wholly blind to the importance of such facts as were easily within his reach.

Fortunately for those who are to come after us and who will seek to understand our actions, as we seek to trace out the causes

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\*The History of the Lumber Industry of America, by James Elliott Defabaugh, Editor of the American Lumberman. Vol. 1, Chicago, the American Lumberman.

of the actions of those who preceded us, the widespread interest in forestry promises to repair this neglect in very large measure. One of the most striking evidences of this movement is the first of a series of four large and handsome volumes on "The History of the Lumber Industry in America," which is just now claiming the attention of the public. This history, which promises to be an indispensable work of reference for those interested in the subject, as well as a most interesting account of the facts, is the work of Mr. James Elliott Defebaugh, editor of the *American Lumberman*. The work is published by the *American Lumberman* in Chicago. Volume I, which is now before us, contains 559 large octavo pages. The matter is divided into 31 chapters. After an excellent account of the discovery and early settlement of America in which the attractions to settlers held out by the forest are clearly shown, the author goes on with an account of North American forest geography. This chapter is especially valuable. It gives an account of the timbered area, with some consideration of the influence of climate upon forests and vice versa, and closes with a cyclopedic list of the commercial tree species of America. This latter portion of the chapter, which must depend for its value upon its perfect accuracy is based upon Mr. Charles S. Sargent's work, "*The Sylva of North America*," and is illuminated with foot notes giving quotations from that work on all points likely to arouse questions or require elucidation. Following this comes a portion of the work which will be of special interest to Canadians. About 135 pages, divided into three chapters are taken up with an account of the forest resources and lumber history of Newfoundland and Eastern Canada. One chapter is devoted to Labrador and Newfoundland. In the account of the latter is given a list of the principal trees found on the island and a brief history of the lumbering business leading up to the Harmsworth concession of which so much has recently been written. A brief summary of the Crown lands timber regulations is also given.

The first chapter, relating to Canada, is devoted to the commercial forests of this country. The omission from this portion of the work of any account of the great Pacific Coast forests of Canada and the industries which have been founded upon them, which omission naturally challenges the attention of the intelligent reader, is explained by a paragraph in which the author says that this 'will be reserved for detailed treatment in connection with the history of the lumber industry of the Pacific coast of the U. S. with which it is closely connected and which have been developed together.' Bare mention is made of the forests of the Canadian Northwest, although the author speaks of a practically continuous forest of sub-arctic species and characteristics, as existing to the north. It is to be hoped that in subsequent volumes the facts concerning this vast forest, which is becoming



better known every day, will be summarized. In the chapter under discussion the general accounts of Canada's forest resources, such as those made by Mr. Stewart, superintendent of Forestry for the Dominion are drawn up so that the reader is given a general idea of the wealth of Canada in this respect. Closing this chapter the author says:

"These speculations are extremely general, but they serve the purpose of pointing out that Canada is enormously rich in timber and the possibilities of long continued production are almost incalculable."

A valuable chapter on the forestry and forest reserves of Canada then follow. This gives an idea of the general trend of the legal conservation of Canada's forest resources. The records of the Canadian Forestry Association have evidently been liberally drawn on for this chapter, and, as near as we can judge, the facts and figures accurately state the position up to the time at which the writing of this volume must have ceased. Concerning the Dominion Forestry Association, the author cites one fact which, as this great work will probably be the standard for many years to come, is worthy of note as giving credit where credit is due. The author says that "to Mr. E. Stewart, superintendent of Forestry, more than to any one man is due the credit of the formation of the Dominion Forestry Association, for it was he who, on February 15th, 1900, called the meeting at which the organization was recommended, and as a result of which the organization was effected on March 8th, 1900, in the city of Ottawa."

The summary of Canadian Forest Reserves shows a grand total of 18,760,000 acres, and an addendum refers to and describes the Nepigon forest reserve of 4, 578,560 acres and the more recent Gaspesian reserve of about 1,600,000 acres under the Provincial Government of Quebec. In the chapter entitled, 'Canada—Production and Trade' the census figures of 1901 in relation to forest products are summarized, as well as many other tables of products, exports and imports, showing the greatness of Canada's trade in these lines. A special chapter is devoted to the cooperage stock industry of Canada which affords opportunity for summarizing the history of a most interesting trade which, to a far greater extent than many think has affected the progress and development of Canada.

Each of the Eastern Provinces of Canada is dealt with separately, a vast deal of information being summarized concerning its forest area and products, the laws governing the exploitation of the forest, the history of lumbering and even the personnel of the trade. As affording a means of comparing the present with the past, the account of Canadian lumbering conditions closes with a summary of a careful article published in 1874, showing the state of the industry at that time.

About half of the present volume is devoted to the history of the lumber industry of the United States. A feature of the first chapter is a table which, though it covers less than a single page, gives a mass of information of immense statistical value. It shows the wooded area of each state, originally, and in 1905, in comparison with its total land area. According to this, the present wooded area of the U. S. is 1,040,450 square miles, or 35 per cent. of the whole. The States vary in wooded area from Alabama, 72 per cent., to Nebraska, 2.9 per cent. The different wooded areas, as well as the changes that have taken place in the course of industrial development are described so as to form an excellent basis for the work that is to follow. The next chapter deals with the U. S. public land policy, which leads up to a consideration of forestry and forest reserves—a most interesting subject—and to tariff legislation, lumber production and foreign trade, each of these great subjects being handled in a separate and voluminous chapter.

Author and publisher alike are to be congratulated upon the design of this work and upon the splendid way in which that design has been carried out thus far. The work is one which must have a large sale not only among those engaged in the trade, but among the students of economics everywhere.

A recently enacted bill in Iowa does away with a long-standing grievance, and ought to do much to encourage the planting of forest and fruit trees in that State. It provides that on any tract of land in the State of Iowa the owner may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one, nor more than five, acres in area, or both, and that upon compliance with the provisions of this act such owner or owners shall be entitled to an assessment on a taxable valuation at the rate of one dollar per acre for the land.

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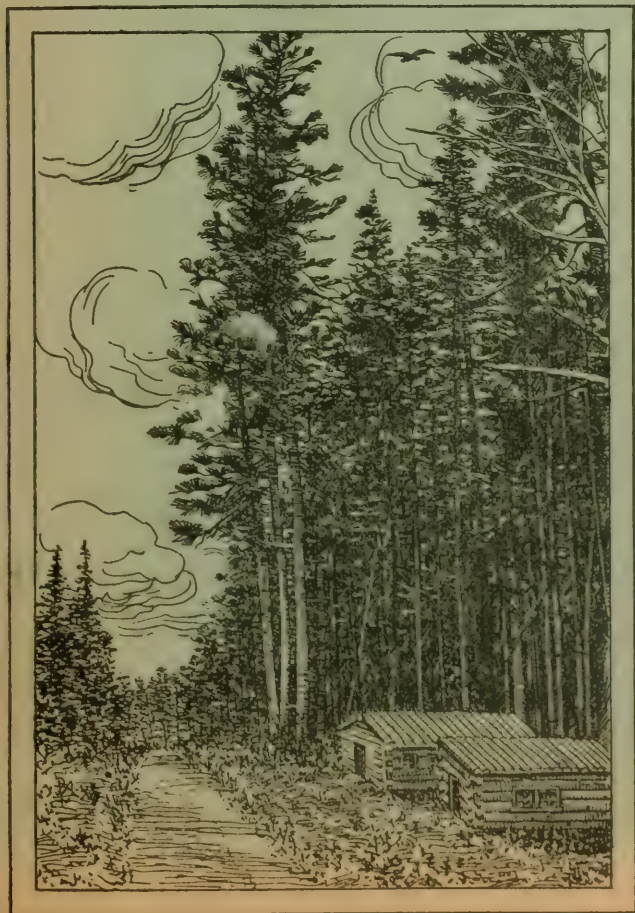
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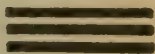
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# CANADIAN FORESTRY JOURNAL.



SEPTEMBER  
1906



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



# Canadian Forestry Association.

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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-afforestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary,

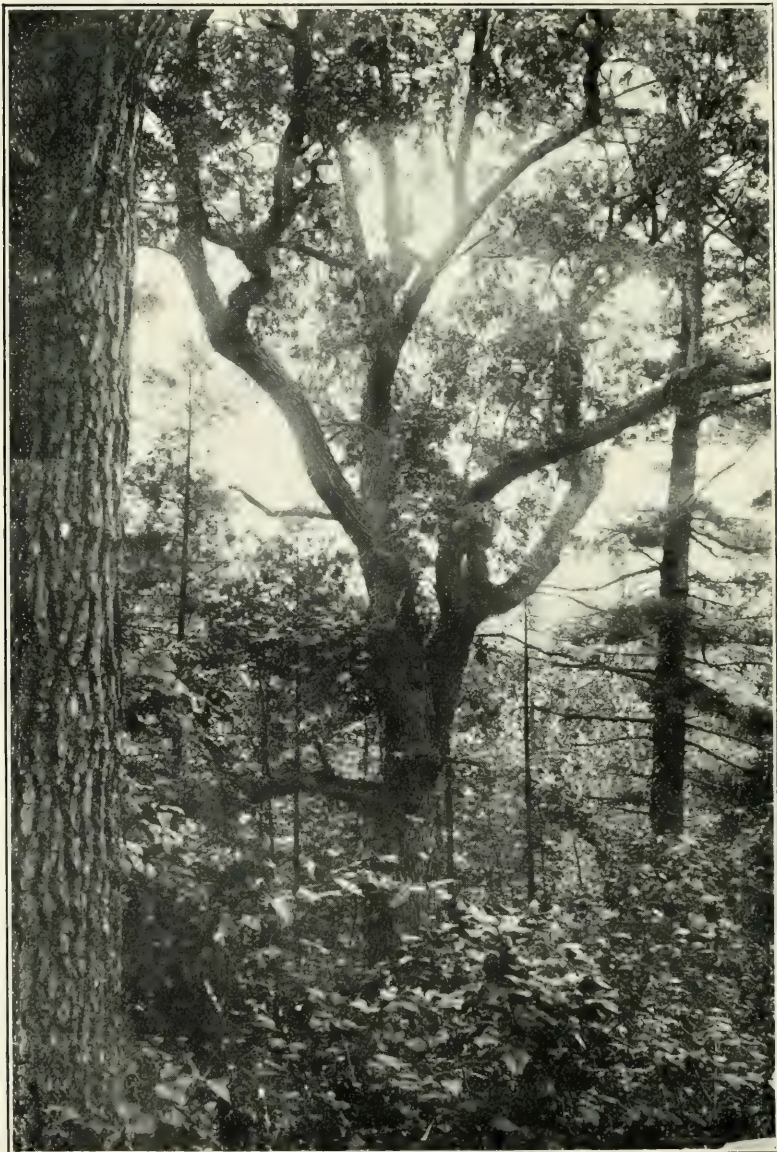
**R. H. CAMPBELL,**

OTTAWA, ONT.

Department of the Interior.







No. 1—A White Oak Weed.

*Frontispiece.*

# Canadian Forestry Journal.

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VOL. II.

AUGUST, 1906.

No. 3.

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## CANADIAN FORESTRY CONVENTION.

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VANCOUVER, B.C., 25TH, 26TH AND 27TH SEPTEMBER, 1906.

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On the invitation of the British Columbia Lumber and Shingle Manufacturers' Association, a meeting of the Canadian Forestry Association will be held at Vancouver, B.C., on the 25th, 26th and 27th September next. This invitation was submitted to the Canadian Forestry Association at its Annual Meeting held in March last, and it was then decided that the invitation should be accepted. The British Columbia Lumbermen's Association is making every preparation to welcome the delegates to the meeting and to make their visit as pleasant and interesting as possible. This is the first meeting of the Forestry Association to be held in British Columbia, and it is particularly desirable that a large number should attend from the Eastern Provinces to show their interest in forestry and their appreciation of the kindness of the British Columbia Lumbermen's Association.

A splendid opportunity will be given to see the forests of British Columbia, and the scenery, both of coast and mountain, which is unrivalled in the world. As the Exhibition at New Westminster will be held in the following week there will be an opportunity for seeing a collection of the best products of the Province. This Exhibition is specially noted for the exhibits of fruit and live stock in addition to the products of the mine and the forest.

His Excellency, Earl Grey, Governor-General of the Dominion, has kindly accepted an invitation to and will open the Convention.

### EASTERN PROVINCES.

The Railway Companies have granted only the usual summer tourist rate for this Convention for points east of British Columbia. Particulars as to rates may be obtained from local ticket offices.

Tickets may be purchased any time up to the 15th September but for Winnipeg and points west, may be used up to the date of the Convention. The final return limit is 31st October. Stop-over privileges will be granted both going and returning at points west of Winnipeg. All tickets must be executed for return passage at destination by joint agent, for which a fee of fifty cents will be charged. Tickets to other coast points than Vancouver are sold at the same rates, and it would be well for those attending the Forestry Convention to secure tickets through to Victoria.

#### BRITISH COLUMBIA.

The usual convention arrangements have been granted for points in the Province of British Columbia.

Delegates must purchase first-class full rate (not temporarily reduced) one way tickets to place of meeting (or, to nearest junction station, if through tickets cannot be obtained) and obtain certificates to that effect on Standard Certificate form. TICKET AGENTS ARE SUPPLIED WITH STANDARD CERTIFICATES AND ARE INSTRUCTED TO ISSUE THEM ON APPLICATION.

Where delegates have to travel over more than one railway to reach place of meeting, they will require to purchase tickets and obtain certificates as above from each railway unless otherwise arranged for, and the issue of through tickets authorized.

The Secretary of the Convention is required to certify on each Standard Certificate, over his personal signature, that the person named on the certificate attended the convention, and to state thereon the actual number of delegates who paid railway fare coming to the Convention AND WHO HOLD STANDARD CERTIFICATES TO THAT EFFECT.

On surrender of Standard Certificates, properly filled and executed, to Ticket Agent at the place where the Convention is held (or at the nearest junction if tickets for the going journey were purchased to it) at least ten minutes prior to time train is due to leave, continuous passage tickets (NOT GOOD TO STOP OVER) for the return trip will be issued, at rates set forth below, on the conditions of the certificate and BY THE SAME ROUTE AS ON THE GOING TRIP.

#### RATES WILL BE AS FOLLOWS:

If one hundred (100) or more delegates hold Standard Certificates, correctly filled in and certified as directed, they will be returned to their original starting point free.

If twenty-five (25) delegates hold Standard Certificates, correctly filled in as directed, they will be returned to their original starting point at one-third of the one way first-class fare (not temporarily reduced).



If twenty-four (24) or less delegates hold Standard Certificates, correctly filled in and certified as directed, they will be returned to their original starting point at two-thirds the one way first-class fare.

CERTIFICATES WILL NOT BE HONORED.

1. If ticket for going trip is purchased more than three (3) days (Sundays excluded) before the date of the opening of the Convention.

2. Unless ticket for going trip is purchased within three days prior to the Convention (Sundays excluded) or during the continuance of the meeting.

3. If not signed at the meeting by the authorized Secretary whose signature appears below.

4. Unless surrendered to Ticket Agent, and ticket for return trip purchased within three days (Sundays excluded) after the adjournment of the Convention.

5. Unless presented to the Ticket Agent not less than ten minutes before train is due to leave.

No certificates except of the standard form (procured from railway agent when purchasing ticket) will be honored.

The Programme in outline is as follows:—

TUESDAY, 25TH SEPTEMBER, 1906.

Arrival and reception of visiting members of the Canadian Forestry Association.

Inspection of Lumber and Shingle Mills.

8.30 p.m.—Public Reception to His Excellency the Governor-General.

WEDNESDAY, 26TH SEPTEMBER, 1906.

10 a.m.—Opening of the Convention;  
Preliminary business;  
Addresses, papers, &c.

2 p.m.—Addresses, papers, &c.

9 p.m.—Banquet.

THURSDAY, 27TH SEPTEMBER, 1906.

10 a.m.—Addresses, papers, &c.

2 p.m.—Addresses, papers, &c.

Papers and addresses will be given by R. H. Alexander, Secretary of the British Columbia Lumber and Shingle Manufacturers' Association; F. W. Jones, President of the British

Columbia Mountain Lumbermen's Association; E. Stewart, President of the Canadian Forestry Association and Dominion Superintendent of Forestry; Overton W. Price, Assistant Forester for the United States; Dr. Judson F. Clark, Forester for the Province of Ontario; Roland D. Craig, Inspector of Dominion Forest Reserves.

The Secretary will be pleased to furnish any further particulars as far as possible.

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The Canadian Pacific Railway Co. has begun tree planting on quite an extensive scale along its western lines. A contract has been let for a small acreage of breaking near Wolseley on which it is the intention to experiment with tamarack for ties. A piece of ground is also to be planted at Medicine Hat with jack pine and tamarack for the same purpose. Over 100 miles of trees are to be planted between Winnipeg and Calgary, for snow breaks, and at several stations trees are to be planted around the station grounds, and prizes are to be offered the section foremen who make the best showing. This work, if carried on successfully, ought to encourage tree planting among the farmers of the west.

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The area set aside for forest reserve purposes has more than doubled in the United States since 1904. In that year it comprised less than 50,000,000 acres, while now more than 100,000,000 acres are reserved. In some states the exemption of large areas from taxation means in the future a serious loss of revenue to the counties in which the reserves are situated. In order to remedy what seemed to be an injustice the Forest Service submitted a Bill to Congress to grant 10 per cent. of the total receipts from forest reserves to the counties in which they are situated. These receipts for the year ending June 30th were \$767,219.96, and they are expected to increase immensely from year to year. The 10 per cent. contributed to the county funds is safe-guarded in the act by a provision that it must be spent entirely for the maintenance of schools and public roads.

## THE TIMBER PIRATE.

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The article of Senator Edwards, published elsewhere in this issue, covers completely the important subject with which it deals—the destruction of valuable timber as a result of the operations of those who make a pretence of settling lands in timbered areas. The matter is mentioned here not in the hope that we can add anything to what Senator Edwards has said, but with the object of urging every reader of the *Forestry Journal* to use his influence to bring about a better public policy than that which now prevails. Opinions may differ as to the best method of accomplishing this reform, but, if the people insist that the question shall not be shelved until reform has actually been accomplished, our legislators will certainly solve the problem satisfactorily.

The fact that, in certain portions of the Dominion, the fire-ranger system has greatly reduced the forest waste is no reason why efforts to make a clear distinction between the real settler and the timber pirate disguised as a settler should be relaxed. This pretended settlement is a cause of steady loss and a constant menace to the most valuable forests we have. The unavoidable dangers are bad enough, but this worst one of all can be removed if the people of Canada will realize the startling fact that the same men who are robbing them of little patches of timber have endangered and are still by their very presence endangering millions upon millions of public forest property.

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The incorporation of the Northern New York Forestry Association last June is evidence of the rapidly growing interest that is being taken in the preservation of the forest and in the replanting of waste lands. The chief object of the organization is to collect and distribute information on these points. The Association will make a special study of the best means of removing the mature timber from the forest without injury to the younger trees and will oppose the policy of those who advocate the leaving large forest areas untouched. Many lumbermen and operators took a prominent part in the organization of the Association.

## THE UNIVERSITY BILL

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One of the most important bills passed by the Ontario Legislature at its last session was the University Bill. Last December a Royal Commission on the University of Toronto was appointed and after a thorough investigation of the needs of the University a report was issued in time for the Government to act while Parliament was in session. The members of the Commission were Messrs. J. W. Flavelle (Chairman), Goldwin Smith, W. R. Meredith, B. E. Walker, H. J. Cody, D. Bruce Macdonald and A. H. U. Colquhoun (Secretary). The work of the Commission was so satisfactory that all but one of its recommendations were adopted by the government and embodied in the University Bill. This recommendation referred to an endowment in land. The Commission wrote: "By the settlement of the Provincial boundary we have obtained control of what is called New Ontario. It does not, therefore, seem unreasonable to express the hope that out of this enormous area at least a million acres will be set aside for the University and University College."

In introducing the University Bill, Premier Whitney said that the matter of land endowment was reserved for further consideration, and that inasmuch as the Government had recently been getting back some lands from the railways, it might be that they would have some lands for the University. He further said that he thought the Government was not prepared to deal with the matter at the present session or words to that effect.

The importance of such an endowment is so great that in our opinion the future of Forestry in Canada depends in no small degree upon the decision that is finally come to by the Ontario Government. We publish elsewhere the recommendations of the Commission relative to instruction in forestry. These recommendations were adopted by the Government and a school of Forestry will be established in connection with the University.

Instruction in forestry must be practical and experimental as well as theoretical. There must be forest lands upon which training may be begun at once in order that the earliest students may receive all the benefits to be derived from a course in forestry, and there must be other lands upon which experiments running over long periods of years may be made. These lands should comprise large areas in different parts of the province so that in addition to serving their main purpose they would prove an object lesson to lumbermen and others holding timber lands in their vicinity. If the recommendation of the Commis-



soon be used upon and a million acres of government land be set aside as a university endowment, half the amount might be made up of virgin forest and half of lumbered and burned over lands. The virgin forest should include pine, spruce and hardwood lands. The lands that have been lumbered or burned over would afford ample opportunity for experimental work. For immediate practical results virgin forest is essential. The appalling waste, the reckless disregard of future needs which characterize most, if not all, forest operations in Canada, will continue until practical demonstration can be made on a large scale of the cutting and selling of the forest under conditions which would ensure the perpetuity of the forest and at the same time yield the full value of the timber cut. Such demonstration could be made every year by those who were responsible for the administration of the endowment lands. The amount of timber cut depending of course upon the needs of the University. In other words an endowment of virgin forest lands would make a large and annually increasing revenue available from the first.

Of almost equal importance with the endowment itself is the tenure under which the lands might be held by the Board of Governors of the University. If the public interests were safeguarded in such a way as to make it impossible for the Board of Governors, or those acting for them, to permanently ignore the forest while retaining in the meantime under the lands might be given to the University outright, but in any case no satisfactory results could be hoped for under a grant of less than fifty years. A lease for one hundred years would be better, with provision for renewal of 25 the conditions under which the grant was made had been lived upon. If it were provided that all proposed sales of timber should be approved by the Lieutenant Governor-in-Council and that after a careful estimate of the growing timber no more should be cut each year than would be replaced by the annual growth, the management of the land might safely be left to the Board of Governors, the greater part of the administrative work falling, of course, to the Forest Department.

Good results cannot be expected of any school of forestry which has not under its control forest lands upon which practical work can be carried on and the most practical side of forestry in a new country like Canada is not re-forestation, but conservation. To cut the trees that may be marketed with profit, to market them to the best advantage, and to preserve the young standing timber should be the chief work of those who have the management of large forest areas. Should the University Board of Governors be given control of the lands they have asked for, the work of their Forest Department would be of incalculable value to the government departments administering forest lands, not in Ontario alone, but in every part of the Dominion.

## SO-CALLED SETTLEMENT IN FOREST AREAS.

BY HON. W. C. EDWARDS.

There is little that is new to be said upon the subject of the injury done to our forests by the system, or lack of system, which allows people, under pretence of making and carrying on farms, to endanger an immense wealth of standing timber. The evil has been exposed again and again, and every day brings new illustrations of the loss to the public to which it gives rise. It is evident, however, that the public have not yet learned the lesson—though they have paid dearly for the schooling—and it is necessary to take every opportunity to make known the facts in order that they may help to create a public opinion which will compel the adoption of a wise policy.

It is necessary to make it plain, first of all, that no complaint is made concerning the bona fide settlers on land fairly suitable for agriculture. The man who makes and carries on a farm is a useful man, and room and opportunity must be provided for him. Even though a genuine settler may occasionally start a forest fire which will destroy far more than that settler's own value to the community, it is not fair to consider the matter in that light. On the whole, the settlement of good agricultural lands, even in timbered areas, is valuable work for the country, and unavoidable accidents, or even ordinary display of human heedlessness, must be allowed for in connection with the work. That which is to be condemned is the mere pretence of settlement, which goes on as a means of plundering the public timber wealth of the country. In districts quite unfit for agriculture men will take up land under the pretence of settlement. They comply with the necessary forms, hold the land long enough to sell the timber upon it, and then abandon their "farms." The few acres on which such a man pretends to settle may be surrounded to the depth of miles with standing timber which either belongs to the public or in which the public has a direct financial interest because royalty must be paid upon every foot of it that is made into lumber. Being a plunderer who merely assumes the disguise of a settler this man has no interest in the immensely valuable timber by which he is surrounded. If, by carelessness in carrying on his own petty and illegitimate operations, he should start a fire which destroys thousands or millions of dollars' worth of timber, he loses nothing, nor can he be punished in any way unless the fact can be established that the disaster was directly due to his wilful or

negligent action—a danger which is practically non-existent, for proof in such cases is impossible.

It is a fact which has often been stated, and is now pretty well accepted by those who have made even a cursory study of the subject, that, for every tree which has been cut down by the lumberman and manufactured into articles of commercial value, at least twenty trees have been destroyed by bush fires—absolutely wasted. I speak with confidence on this subject so far as the forests of Eastern Canada are concerned, and I believe that those familiar with conditions in the great forests of the West will agree that the proportion of waste that I have given holds for that portion of the country also. The loss to the country in this way is beyond all calculation. There is no more saddening example in our country of needless waste than this destruction by fire of immense tracts of timber which, if now standing, would form one of our most valuable assets.

The public formerly regarded forest fires as natural phenomena or as visitations of an inscrutable Providence. But, just as it has been learned that epidemics of disease are due to human ignorance or carelessness, and can be prevented, so it is now pretty generally understood that forest fires, as a rule, have their origin, not in natural and ungovernable causes, but in the heedlessness or negligence of men. And, of all those who are guilty on this count, the worst by far is the man who makes pretence of settling as a farmer on land which should be continued in forest growth. In 1904 I made the formal and deliberate statement to the Quebec Commission on Colonization, that, in my opinion, at least ninety per cent. of the forest destruction in Ontario and Quebec had been due to settlers setting fires for the purpose of clearing the land. I have not changed that opinion nor do I see how one can reach any other conclusion who has had means of estimating what fearful destruction even one careless person can cause. I quoted to the Quebec Commission one case within my own knowledge, the destruction of a large portion of the most valuable pinery on the River Eagle, a branch of the Gatineau, by a settler clearing land for a potato field. It would be laughable, if it were not so sad, to think that, while the settler raised a crop worth, perhaps, \$5.00, the public suffered a loss of at least \$1,000,000. This is not an isolated instance, even in the amount of waste, for equally destructive fires, arising from the same cause, are known in many portions of Eastern Canada.

There is a way to clear land by burning without destroying the country. By setting the fire in proper relation to the direction of the wind, carefully watching the fires set, and taking other simple precautions, fire can be restricted within any desired area. The bona fide settler, the man who is really making

a home for himself and his family and who looks forward to spending a lifetime of growing prosperity in the home he is creating, is ready to take these precautions, for they are all in his own interest. But the so-called settler who has taken up a little patch of land merely that he may rob the country of the timber that stands upon it, is in a hurry to realize his gains, and expects to abandon the place as soon as he has done so; consequently, he has no more regard for the rights and interests of others than has any other pirate.

It is very satisfactory to be able to state that the fire-ranger system adopted by the Provinces of Ontario and Quebec is greatly reducing the destruction caused by forest fires. As that system is more fully established and covers a wider range of territory its beneficial results become more apparent. Countless acts of carelessness on the part of settlers, prospectors, sportsmen and others, which, in former days, would have resulted in widespread fires, are prevented or their injurious results checked in good time. The constant increase, in recent years, in the value of standing timber, means that the saving due to careful supervision is greater than it would have been in former times when a great portion of the timbered area had little or no value, owing to lack of facilities for bringing the product to market.

On the other hand, this increase in value means that there is all the greater inducement to the so-called settler to carry on his nefarious schemes. There is a tendency also to systematize this form of robbery, certain parties keeping as their employees or retainers a number of men who make a practice of securing timber lands by this illegitimate means of pretended settlement. The more valuable the standing timber becomes, the greater is the inducement to schemers of all kinds to find means of capturing the timber on the public domain without rendering an equivalent to the public either in money or in service. This means that the law should be made more and more stringent—on the simple principle that the more valuable the thing to be guarded, the more careful should be the watch that is maintained.

The public would be more alive to the importance of this matter, I believe, were it not for an indefinite opinion—but one strongly held—in the minds of many people that our timber resources are "inexhaustible." With the keeping down of fires and the improved methods of taking off the crop, I believe it is possible to go on cutting spruce in our eastern forests for an indefinite time. But the same is not true of our pine, the crop upon which our calculations of forest wealth in the past have mainly been based. The pine tree does not grow so large or yield such good timber in the northern country as it does in the region where the most extensive lumbering



operations are now carried on. This means that our pine supply is by no means "inexhaustible," as so many are apt to think. At the rate at which destruction now goes on, the pine of eastern Canada will, in time, follow the pine of Michigan, which as many will remember, was spoken of as "inexhaustible" not so very many years ago. The more the waste by fire is prevented the better chance we shall have to keep our spruce as a perpetual source of revenue and to prolong the returns from our pine. And, if fires are to be prevented, it is not enough to maintain a fire-ranging system to put out fires,—the man who most frequently starts the fires, the pretended settler, must be eliminated.

Though I have dwelt upon the saving of the standing timber, that is not, by any means, the only point to be considered. No matter how valuable the standing timber, it would be disastrous to the country to turn it all into money. Upon the maintenance of the forest depends the proper balance in the flow of our waters. This is a vital point in agriculture and in all the industries based upon agriculture. But the point of immediate importance is the maintenance of our water-powers. Considering their force, their wide distribution and the ease with which they can be developed, the water-powers of Canada, I believe, are second to none in the world in immediately prospective value. People used to smile when they heard me say, some years ago, that, because of its timber and its water-powers, the Province of Quebec must soon be regarded as richer than any other Province or than any State of the American Union. Industry has now reached the stage of development at which the value of the rivers in Quebec that rush down from the mountains to the sea is about to be generally realized. Take away the forest and you take away these water-powers as commercially useful agencies,—the water may still flow, but it will be in the form of freshets in the spring and rivulets in the autumn, a form which could no more be made useful than the cyclones of Dakota can be made useful. There is no danger that lumbering, as it is now carried on by the best firms, will denude the country so as to unbalance the regular flow of the streams. The trees taken off are those which, while they are most valuable in the market, can best be spared from the forest. They are quickly replaced by younger growths which prevent the too-rapid melting of the snows and preserve the forest floor which acts as a vast sponge in keeping back the too-rapid outflow of the waters.

The problem of our forest wealth can be answered by keeping down the ravages of fire; and the problem of keeping out, or putting down, fire can be answered by our present methods together with the elimination of the timber pirate who operates in the disguise of a settler.

## SOME TYPES OF FOREST WEEDS

JUDSON F. CLARK.

From the Standard Dictionary we learn that a "weed" is "any unsightly or troublesome herbaceous plant that is at the same time useless or comparatively so . . . ; especially such a plant as is positively noxious or injurious to crops, . . . also "any herbaceous plant out of place." Had the lexicographer omitted the word "herbaceous" his definition would, I think, describe the greatest bane of rural life to a nicety. To adapt the definition thus amended to forest conditions we must read "wood crops" instead of simply "crops." A shorter definition of the term "forest weed" would be "a plant which is injurious to the reproduction, growth, or quality of wood crops."

I recall having once been taught that all agricultural bugs fall into two classes, viz.: those which feed by eating the plant, and those that live by sucking the plant juices. The individual bugs of each class were said to be very numerous, but the treatment of all was simplicity itself, namely, to feed the "biters" with paris green and bathe the "suckers" with kerosene emulsion. Plants which are injurious to the reproduction, growth, or quality of wood crops resemble the agricultural bugs, in that they fall into two classes, both as regards their life habits and methods of treatment. Herbaceous plants and shrubs form one class, and undesirable trees the second.

The herbs and shrubs are alike in that they are absolutely dependent for their existence on the light that is able to penetrate through the "canopy" or "crown cover" of the forest. Many herbs and shrubs are killed by even moderate shade, others are killed only by a comparatively dense shading. No herb or shrub can thrive sufficiently to cause appreciable harm under a close crown cover of many of our native forest trees. The hard maple and the beech among the hardwoods, and the hemlock, spruce, and fir among the conifers are especially notable for the density of their shade. The absolute necessity of light for plant development on the one hand and the possibility of shading the forest soil on the other at once suggests the remedy for herbaceous and shrubby forest weeds, which is to establish or maintain a crown cover of at least moderate density where such weeds are troublesome or likely to be so. In the case of groves of trees having open crowns, such as the black walnut, or tulip, or old oak stands, underplanting with beech or hard maple is sometimes resorted to to destroy the weeds and to protect the soil from sun and wind.



No. 5—A White Pine Weed.  
(Courtesy of U. S. Forest Service.)



No. 3—A Black Cherry Weed.





No. 7—An Undergrowth which is not Weed Growth.



No. 6—Weed Ironwoods.



By virtue of their ability to form part of the crown cover and thus insure their light supply, the weed trees constitute a special class requiring radically different treatment. Here again, however, no matter how varied the kind, age, or quality of the weed trees, the practical forester has but one remedy, and that remedy is the ax. Figures 1-6 illustrate several types of this class of forest weeds.

In Figure 1 is seen a particularly bad example of a white oak weed. This tree, with its much branched and hollow trunk, is entirely worthless, except for fuel, and even for this purpose it is hardly holding its own, the annual loss by decay fully offsetting the gain by growth. Meanwhile it is shading to death seven white pine saplings, any one of which could occupy the space to excellent advantage. Very evidently the proper treatment is to fell the oak, taking care to save at least one, but better several, of the pines.

This should of course have been done many years ago. The pines, though not more than two to four inches in diameter, are all over 40 years old, their small size being entirely due to the limited supply of light which was available under the huge crown of the oak.

Figure 2 shows a struggle for possession of a small opening in the forest between a chestnut and a white pine, with all the advantage in favor of the chestnut. In fact it is evidently but a matter of time when the pine will be entirely destroyed by its rival. The chestnut, like the white oak and pine, is an exceedingly valuable forest tree. This particular specimen is, however, to be regarded as a weed in that it is of inferior form and is hindering the development of what is undoubtedly a more valuable neighbor.

Figure 3 illustrates a large black cherry standing over a splendid reproduction of white pine. Any tree shading so fine a stand of young pines would necessarily be classed as a weed, especially if the soil were sandy as is the case where this photo was taken. The cherry being sufficiently large for logs, this "improvement cutting" should be a very profitable move whether viewed from the standpoint of present returns or that of future revenue.

Figure 4 illustrates the baneful influence of an older and inferior tree in a young hardwood stand. As is readily seen, this tree is itself almost wholly worthless and incapable of improvement. Originally the reproduction of young hardwood trees, so well shown in the background, obtained light equally well immediately around this tree. The seedlings were, however, gradually shaded to death and finally disappeared. A few of the more hardy ones still survive, but are stunted almost or quite

beyond recovery. Viewed from the forester's standpoint, there is here a portion of excellent forest land which has for twenty years been wholly non-productive. The removal of the weed tree which is the cause of the trouble will be immediately followed by a vigorous natural reproduction by seeding from the neighboring trees.

In Figure 5 we have a good example of what foresters call "advance growth." The meadow on the right has been seeded from the trees on the left. The first seed year was—on account of grazing, unfavorable weather conditions, or other cause—productive of but slight result, a tree here and there being all that survived. A second seed crop was more fortunate and resulted in a splendid stand of young trees all over the meadow. Under the circumstances the two older trees shown standing together in the centre of the illustration are forest weeds. If they remain they will, because of their advantage in height over their near neighbors, grow to be broad-topped branchy trees, producing a very inferior grade of lumber. If they are removed at once the gap will be quickly closed by the growth of the younger trees, which, being of fairly even height and standing closely together, will grow tall and straight. The lower branches will, because of the density of the shading, die before they become large and finally drop off, thus improving the quality of the wood produced.

Figure 6 illustrates the condition of many Western Ontario woodlots. For many years this woodlot was not grazed, and contained a fine growth of young timber of a dozen species. 11 years ago it was opened for cattle grazing, and has been used for this purpose to a greater or less extent every season since. During the early years of the grazing it was noticed that there was a great destruction of the young trees, but as there seemed to be plenty remaining, it was thought that no great harm was done. When this photo was taken, an examination was made of about four acres, with the result that there were seen many hundreds of hop hornbeam and blue beech (Ironwoods), some six or seven elm, but not a single ash, oak, basswood, or maple, although many large seed trees of these species were present. The small trees shown in the figure are ironwoods exclusively. The hop hornbeam and blue beech are so nearly worthless for forest purposes that they are always regarded as weeds, the more so in that they are prolific producers of seed and can thrive in a comparatively dense shade, often occupying the ground almost to the exclusion of better species. Live stock do not care for their foliage, hence they are unduly favored where even light grazing is practised.

Figure 7 gives a view along a line fence between woodlots in Huron County, Ontario. The lot on the left has been heavily



No. 2—A Chestnut Weed.



No. 4—A Soft Maple Weed.





grazed, that on the right has not been grazed for 9 years. Many farmers regard an undergrowth of young trees such as is shown on the right as so much weed growth, and it is by no means uncommon to find owners desirous of improving their woodlots, going to considerable trouble and expense to clean up such growth. This is a very great mistake. An undergrowth of young forest trees not only insures the perpetuity of the woodlot—furnishing young trees to immediately occupy the places opened by the removal of mature trees—but greatly contributes to the vigor of growth of the larger trees present by shading the soil from sun and wind. The function of the undergrowth in shading the soil from the light is to prevent the growth of moisture-robbing weeds and to conserve the humus content in the soil. The exclusion of the wind prevents direct evaporation, and enables the fallen leaves to lie in place to form a protective surface mulch, which is alike valuable as a conserver of moisture and as a fertilizer.

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The forest reserves of the United States estimated to be worth \$250,000,000 in cash are now being administered at a cost of less than one-third of 1 per cent of their value, while increase in that value of not less than 10 per cent. a year is taking place. Receipts from sales of timber are increasing so rapidly that in the near future the forest reserves will be self-sustaining.

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That forest planting on waste lands and watersheds will prove profitable is the opinion of many large industrial companies in the United States. The rapidly diminishing supply of railroad ties, mine timber and lumber, has made the necessity of planting clear to far-sighted users of forest products. Among these are the H. C. Frick Coke Company, The Keystone Coal and Iron Company, The Pennsylvania Railroad Company, The Johnstown Water Company, The Monroe Water Supply Company and the Pennsylvania and Lehigh Coal and Navigation Company. The water supply companies have been forced to take action on account of the decreasing water supply, due to the denudation of the forest. The U. S. Forest Service co-operates to the extent of sending a technical forester to make a preliminary examination of the lands on which planting is contemplated. This determines whether planting is advisable. If the preliminary report is favorable, a detailed plan for planting and nursery work can be made at a cost to the owner of the actual expenses of the work.

## THE DECIDUOUS WOODS OF BRITISH COLUMBIA.\*

BY J. R. ANDERSON.

**BROAD-LEAVED MAPLE**—*Acer macrophyllum*.—This tree is so named on account of the extraordinary size of its leaves, one authenticated specimen which I collected measured  $16\frac{1}{2}$  inches from the point at which the stem joins the leaf, to the tip of the leaf, and  $12\frac{1}{2}$  inches across. The flowers come early, before the leaves, and are of a yellowish white in crowded pendant racemes. The leaves turn a golden yellow in the autumn. This is probably the commonest and best of this class of our woods. Its range is all over the lower lands of Vancouver Island, the Gulf Islands and the mainland to the westward of the coast range. It grows to a large size, the trunks frequently attaining a diameter of three and four feet, and when growing close together, or with other trees, very straight and tall. When growing singly in the open it forms a magnificent shade tree, one remarkable specimen near Victoria, covering a space of probably eighty feet in diameter. Other specimens at Alberni, by actual measurement, cover spaces of sixty feet and over. The wood is close grained, takes a fine polish and is well adapted for furniture, inside finishing and carriage building. That part, which, by reason of an abnormal growth, is known as "Bird's Eye Maple," is very beautiful. Although utilized by furniture makers, and in some cases for inside work, it is comparatively little used and is only cut by one or two mills to supply the demand. The natives, where this wood occurred, used it to a considerable extent for paddles, and for some articles of domestic purposes.

**THE SMOOTH MAPLE**.—A smaller tree which is sometimes erroneously called Vine Maple, is *Acer glabrum*, with two other synonyms. On Vancouver Island and the lower mainland it sometimes attains to the dignity of a tree. The leaf is five-pointed, flowers few, on the coast, but plentiful inland, where it never attains a size larger than a large bush. I may say that according to my recent investigations, I feel a doubt as to the identity of the inland tree with that of the coast. The wood of this variety is white and close grained, but it has never to my knowledge been put to any practical use; this, however, may be accounted for by the fact that it does not occur in any great quantities. This maple is very ornamental, and makes a fine

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\*Part of a paper read at a meeting of the Natural History Society, Victoria, B.C., 14th May, 1906.

shade, and as it does not grow to any great size, is well adapted for small grounds. The leaves in the autumn turn red, sometimes striped with yellow.

VINE MAPLE—*Acer circinatum*.—This tree, as its name indicates, grows small and crooked, much in the shape of a vine. Its range is confined to the mainland, to the westward of the Coast Range of mountains, where it grows in dense impenetrable thickets, and does not occur on Vancouver Island or to the eastward of the Coast Range on the mainland. It seldom exceeds 8 inches in diameter at the butt, and is a most useful wood to the settler, as, the wood being tough, it makes excellent wagon tongues, handles for implements, ox bows, and various things of that kind. The natives made use of it for various household utensils, such as spoons, dishes, etc. The bark is smooth and green, the leaves are seven-pointed, nearly round, turning to a beautiful scarlet in the autumn; the flowers, which occur in loose corymbs, are a dark red, and the seeds are in twos, with the wings spread at right angles.

WESTERN OR RED ALDER—*Alnus rubra*.—So called on account of the sap, which turns to a dull red when exposed to the air, and was used by the natives as a dye for basket work, mats, etc. The habitat of this tree is the low rich valleys, where it generally grows in large groves, attaining a size from 10 inches to three and even four feet at the base, and height of 50 to 100 feet. The bark is white on the outside, smooth on the younger trees and roughened, with wart-like excrescences in the older trees. The range is principally along the sea coast of the mainland and Vancouver Island. The tree can hardly be called a handsome one, being of a rather stiff, formal character. The leaves are a dark green, often whitish on the under side, oval in shape, and falling on the approach of winter without turning color. Like some other trees of this family, it bears staminate and pistillate flowers separately, the former in the shape of what are popularly known as catkins, emitting quantities of yellow pollen in the spring. The wood, which is of a light brownish color, nearly white, resembles black walnut in grain, and is used stained to the proper shade, in imitation of that wood, for furniture, inside finishings, bannisters, etc. The natives used this wood, which is easily worked, for various purposes of domestic economy. Spoons, dishes, boxes and furniture, such as they required, and the inner bark as before mentioned, as a dye.

MOUNTAIN ALDER—*Alnus rhombifolia*.—This is a small insignificant tree or bush, generally growing along water courses on the steep sides of high mountains, taking the place often of larger trees, which have been destroyed by avalanches, but occurring sometimes on the low lands on margins of lakes. It seldom or never grows straight, usually in a contorted form, especially when

growing in localities where snow lies deep, and avalanches occur. The wood is soft and pliable, and the tree is therefore well-adapted to withstand the rough treatment of alpine regions. The leaf is a bright glossy green, covered with a somewhat aromatic gummy substance, which extends to the stems. The wood is worthless, and is only used for fires where no better is to be obtained.

POPLAR OR COTTONWOOD—*Populus trichocarpa*.—so called on account of the cottony material which carries the seed, is a common tree throughout the province, on low lying lands in the vicinity of water. It attains to a large size in favourable localities, three to four feet in diameter being common, and attaining a great height in dense forests, along river banks, and on low islands. The wood is very little used, being white and soft, without any great quality to recommend it. The principal use it has been put to is for the manufacture of excelsior, for which purpose it is well adapted. It has also been used for boxes, being very light, but the objection to its use for this purpose, I am informed, is that it turns dark after being sawed. Probably this difficulty could be overcome by allowing the wood to season in the log, or by other methods. It, also, I am informed, makes excellent pulp for paper. The bark turned inside out is used by the Kootenay Indians in the construction of their peculiarly shaped canoes. The young buds exude a brown gummy substance, very aromatic, and hence the tree is frequently known as Balm of Gilead. The leaves, which are somewhat cordate, or heart-shaped and pointed, attain a large size, on young trees, from 10 to 11 inches long, and 7 inches broad, bright green on the upper sides and white on the under sides; these leaves, when shaken by the wind, give a very curious appearance, and suggest a white-flowered tree. On older trees the leaves are much smaller. Growing in the open, this is a handsome tree, much more so than the stiff-growing Lombardy Poplar, which is so frequently planted in our grounds.

ASPEN-LEAVED POPLAR—*Populus tremuloides*.—So called on account of the tremulous effect of the leaves, which become agitated with the least breath of air. I know of no pleasanter sound than the rustle of these leaves, when, after crossing a hot, treeless prairie, one finds oneself by the side of a stream shaded with this beautiful tree. It probably is more wide in its distribution than any other tree, occurring as it does from the Atlantic to the Pacific, and forming the principal source of wood supply in Manitoba, Alberta, and Saskatchewan, where the groves, or forests, are designated "bluffs." In some parts of our own province also, it constitutes the principal wood for fences and fires. The bark is usually smooth and white, the leaves nearly round and slightly pointed; the wood is soft and decays



quickly; it, however, even in its green state, makes excellent firewood. Its habitat is usually on the margins of streams and low-lying land, but it also occurs on the high lands, both of the mainland and islands. It usually attains a size of six to twelve inches, but is often larger, and from twenty to seventy-five or a hundred feet high in this province. The sap, which is stripped from the wood in the spring, by the natives for food, by means of a bone implement made from the rib bone of a deer, is quite sweet and of rather a pleasant flavour. The ribbon-like strips of sap are sometimes laid crosswise of each other, dried in the sun and kept for future use.

WILLOW, known botanically under the generic name of *Salix*, is a genus which has not been well worked out, and I therefore will not trouble you with details which probably are of no practical interest. The largest of the willows in this country is that known as Hooker's Willow (*Salix Hookeriana*). It occurs commonly on Vancouver Island and the lower mainland, often near water, but it is quite ubiquitous in its habits. It often attains a size of 12 inches at the butt, but never any great height. The wood resembles the variety used in England to make cricket bats, and would probably answer the purpose well. The habitat of the genus *Salix* is almost invariably near water or wet land; it comprises a large number of species, some of which are tiny plants, barely an inch high. The latter occur only on high mountains near the snow line

WESTERN WHITE OAK—*Quercus Garrayana*.—Sometimes called *Quercus Jacobi*. The range of this tree is altogether confined to Vancouver Island and Gulf Islands, not a single specimen occurring on our mainland, but it appears in the adjacent States of Washington and Oregon, extending to California. Patches of it occur on the southern end of Vancouver Island and for about one hundred and fifty miles north. In some places it attains a size of from three to four feet in diameter with good straight trunks, from which logs can be obtained from ten to twenty feet in length. It is likewise a highly ornamental and shade tree. The wood resembles English oak in appearance, having a beautiful grain, but it has never been much used, principally I believe on account of the difficulty of seasoning it properly, or rather the necessary room and capital for storing it away for several years. It is used to a limited degree by cabinet makers for ornamental furniture and other purposes of that kind. The bark is usually whitish in appearance, deeply scored in the older trees, affording excellent shelter for the eggs of the Oak Tree Looper, which, during the last two years, devastated the oak forests in the vicinity of Victoria. The leaf bears a considerable resemblance to that of the English Oak. The acorn, prepared in a peculiar

manner which it is unnecessary to describe particularly, is used as an article of food by the natives further south.

ARBUTUS OR MADRONA—*Arbutus Menziesii*.—This is quite a common tree on Vancouver and Gulf islands, and on some parts of the coast line on the mainland. It is a striking looking tree with its red bark and evergreen leaves, most ornamental for large grounds. As a rule it does not attain a great size, especially when growing on exposed rocks, and headlands, but trees a foot in diameter are common, although as a rule twisted and crooked. When growing in forests, however, it grows fairly straight, and sometimes attains a large size. On the Alberni road, in the vicinity of Nanoose Bay, many fine specimens are to be seen. When travelling in company with Dr. Fletcher and the Rev. Mr. Taylor, some time ago, I took the measurement of one tree which was ten feet five inches in circumference. I am not aware that the wood of this tree has been put to any particular use, it is hard, fine and close grained, takes a good polish, but is apt to warp and check if cut before being well seasoned. By the natives it was used for gambling sticks and rollers, the latter being in the form of discs some two inches in diameter, which are divided into two parts and concealed in a kind of oakum made of cedar bark. I cannot describe the game, but the discs are rolled over a mat, one of the discs being, I believe, the king. The laurel-shaped leaves of this tree are a beautiful bright green, remaining on the tree for two years, so that there is a constant succession of evergreen leaves. The flowers are borne in dense compound racemes, whitish yellow, with a strong odor of honey, which they evidently produce in large quantities, as bees frequent the trees in great numbers. The fruit, a beautiful red, somewhat roughened on the surface, resembling small strawberries, is greatly relished by grouse and other birds in the autumn.

DOGWOOD—*Cornus Nuttallii*.—A highly ornamental tree with immense white flowers is fairly abundant throughout the islands and the coast of the mainland. It often attains a size of twelve inches in diameter, and a height of thirty feet or thereabouts, and has a fine-grained, hard and pinkish wood, which takes a good polish, not used to my knowledge, except in isolated cases, for ornamental work. The fruit is borne in dense spherical heads of 30 or 40 drupes, which turn red as they ripen and form an article of food for birds of various kinds, including grouse. The leaves are of dull green, turning to a dull red when touched with frost. The bark is smooth and somewhat white—a tree well worth cultivating, but rather difficult to transplant.

BUCKTHORN—*Rhamnus Purshiana*.—Sometimes called Bearberry, and from that often wrongly called Barberry. Is not an uncommon tree on the islands of Vancouver and the Gulf, and on

the coast of the mainland. It attains a size of about a foot in diameter, but is more frequently smaller. The wood is of a light yellow color, close-grained and hard. Not used, except for ornamental purposes. The bark, which is the medicinal Cascara Sagrada of commerce, has been collected in large quantities in the adjoining States, where, on account of the wasteful methods practised, the tree is fast disappearing, and frequent enquiries have been made as to its occurrence in this province and the chances for obtaining a supply of the bark. I have discouraged all enquirers as I am of opinion that such matters should be strictly supervised and if possible, made a source of revenue. The bark is white and smooth, the leaves a beautiful dark green, the fruit black, about the size of a pea, and much affected by wild pigeons.

**CRAB APPLE**—*Pirus rivularis*, with a synonym of *Malus rivularis* grows commonly in swamps on the mainland, to the westward of the Coast Range, on Vancouver Island and the Gulf islands. It seldom attains a larger size than nine inches, the wood is hard and close grained, and is principally used for rollers in mills and for like purposes. The bark is dark and somewhat roughened, the leaves resemble those of the domestic apple, somewhat smaller, the flowers are white, resembling apple blossoms, and sweet-smelling. The fruit is intensely acid, and makes good jelly. The natives use it cooked, mixed with oolachan grease, and in that form it is considered a great delicacy. Crab stocks are sometimes used for grafting apples upon, and succeed very well, when good healthy stocks are used.

**WHITE THORN**—*Crataegus rivularis*, and possibly another variety, is found in most parts of the province, growing to a size of six inches, and from twelve to fifteen feet high. The wood is not used for any purpose; it is an excessively thorny tree with a white bark, the leaves a bright green, flowers white in corymbs, and very ill-smelling, something like bad fish. Prof. Sargent, the American authority on forestry, has been working on this genus, and makes out 115 varieties. Pears may be grafted on the White Thorn, but I found in one instance, that Bartlett's, although attaining a fine size, quite lost their identity, and were quite useless.

**BIRCH**—*Betula papyrifera* or *B. occidentalis*.—There is some confusion as to the proper designation of our large western variety. Its range is principally on the mainland, some few specimens occurring in scattered localities on Vancouver Island. In some places it grows to quite a large tree, two to two and a half feet through, but generally it does not attain a larger size than 8 to 10 inches. The bark is quite white, on the outside, and was used by the natives of the interior in the construction of canoes, baskets, etc.; the wood is white, but has not been used for any particular purpose but fire-wood. It makes a fine orna-

mental tree, and is well worth cultivating. There are other varieties, one with dark brown bark, growing on the margins of lakes and streams, not so large as the first named, and another, a mere bush.

CHERRY—*Prunus emarginata*.—The range of this tree is principally on Vancouver Island and the lower mainland, although smaller specimens occur in parts of the upper mainland. In the first-named sections, it ordinarily attains a size of from six to twelve inches, and probably forty feet high. The bark, a reddish brown color, was used by the natives for fastening the feathers to their arrows when they used those weapons for shooting aquatic animals, as the water does not affect it as is the case with sinew, which was ordinarily used; it was, and is now, also used in the ornamental part of basket work, mats, etc. Growing in the open and when covered with its white blossoms or red fruit, it forms an ornamental tree. The fruit is, however, inedible, being very bitter and astringent. A prototype of *P. emarginata*, resembling it in every particular, occurs at Nelson, and probably in other parts, the fruit of which is acid, without any trace of bitterness, and is used for jelly-making. The only other congener of this genus is the Choke Cherry, (*Prunus demissa*) a mere bush. It is plentiful in the upper country, and occurs in isolated patches on Vancouver Island.

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That the homestead lands of the United States are nearly exhausted is shown by a Bill which went into effect July 1st, which makes provisions for homesteads on forest reserves. To most Canadians this will seem a retrograde measure, though the conditions are so different in the two countries that what may be considered a necessity in the United States need not be thought of in Canada. With the exception of certain counties in California and South Dakota, the new regulations apply to all forest reserves. They provide that where lands comprised in a forest reserve are chiefly valuable for agriculture and may be occupied for agricultural purposes, without injury to the forest reserve, and which are not needed for public purposes, they may be opened up for entry in accordance with the provisions of the homestead laws and the new Act. The Act goes so far as to provide that even when the land is covered by merchantable timber, it may be opened for settlement upon strong evidence of its value for agricultural purposes, both as to production and accessibility to a market.



## THE DOMINION FOREST RESERVES ACT.

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The establishment of a number of Forest Reserves upon Dominion Lands by the Forest Reserves Act passed at the last session of the Dominion Parliament is the result of a movement which began about the year 1893. At that time the Minister of the Interior took up the question of Forest Reservations, and a report thereon was made by the Crown Timber Agent at Winnipeg.

In his report he had the following statement in regard to the reservation of timbered lands and districts: "The problem for consideration, as to the best course to pursue in order to set aside and maintain a proper proportion of the timbered lands, is one of varying difficulty. A careful adjustment between the present needs of the population for wood material, and the needs of future generations, and of a forest cover for hydrologic purposes appears desirable. It may be discussed under two heads.

"First, the best plan to adopt as regards unsettled lands not suitable for agriculture.

"Second, the maintenance and preservation of such smaller areas of wood as are to be found on the sections in localities more favorable to agriculture, and which are or will eventually become, the property of settlers in such localities.

"Upon the first branch of the subject I may say, primarily, there is a widespread and general desire among the farming community and settlers in the country that the greatest precaution should be taken to preserve such tracts of bush land, and that it would be advisable to withdraw from settlement any large areas of land obviously unsuited to agriculture, and maintain them permanently in timber, under proper regulations, instead of allowing them to be stripped of all merchantable timber in a wasteful and improvident manner, and then abandoned as waste lands.

"The reservation of such areas would render necessary a transfer and exchange for others, of such sections as have been set apart and accepted by the different railway companies under their land grants. Upon this point I may say that I am of the opinion that if all the wooded districts in the country had been entirely retained in the hands of Crown their administration could have been effected with much greater facility and success. The disadvantages of the present system are many and obvious.

"As has been pointed out in previous communications upon this subject, the question of the preservation of the timbered districts is one of far reaching potentiality. All experience goes to prove that in this and every other country from which information and reports have been gathered, that the most serious and disastrous results to agriculture, have inevitably followed the deforestation of the timbered lands.

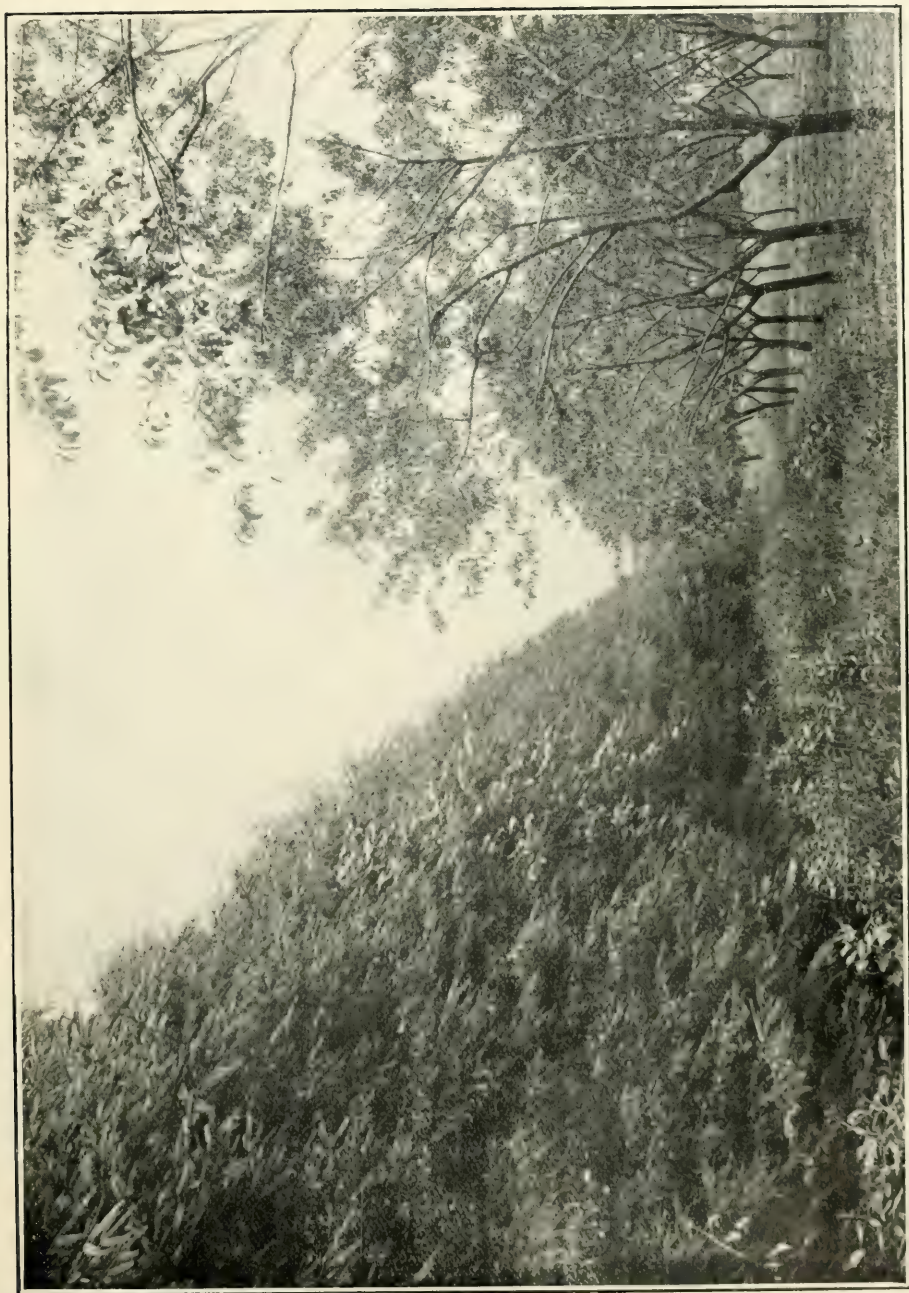
"I wish therefore to state here briefly that I am of the distinct opinion that in localities which are reliant solely upon a certain area or block of bush land for their supply of necessary wood, that such area should be maintained, preserved, and guarded as and for wood reservations, for the use of the people for all time; and also because of the unfavorable influence their destruction and removal would undoubtedly exercise upon the climatic conditions of the country."

The agent submitted several recommendations in regard to reservations in the Province of Manitoba, and it was finally decided that the policy of setting apart reserves should be adopted. The first reservations made were Turtle Mountain Reserve in Southern Manitoba, and Riding Mountain and Lake Manitoba West reserves in Northern Manitoba, which were set apart by order of the Minister of the Interior on the 13th of July, 1895.

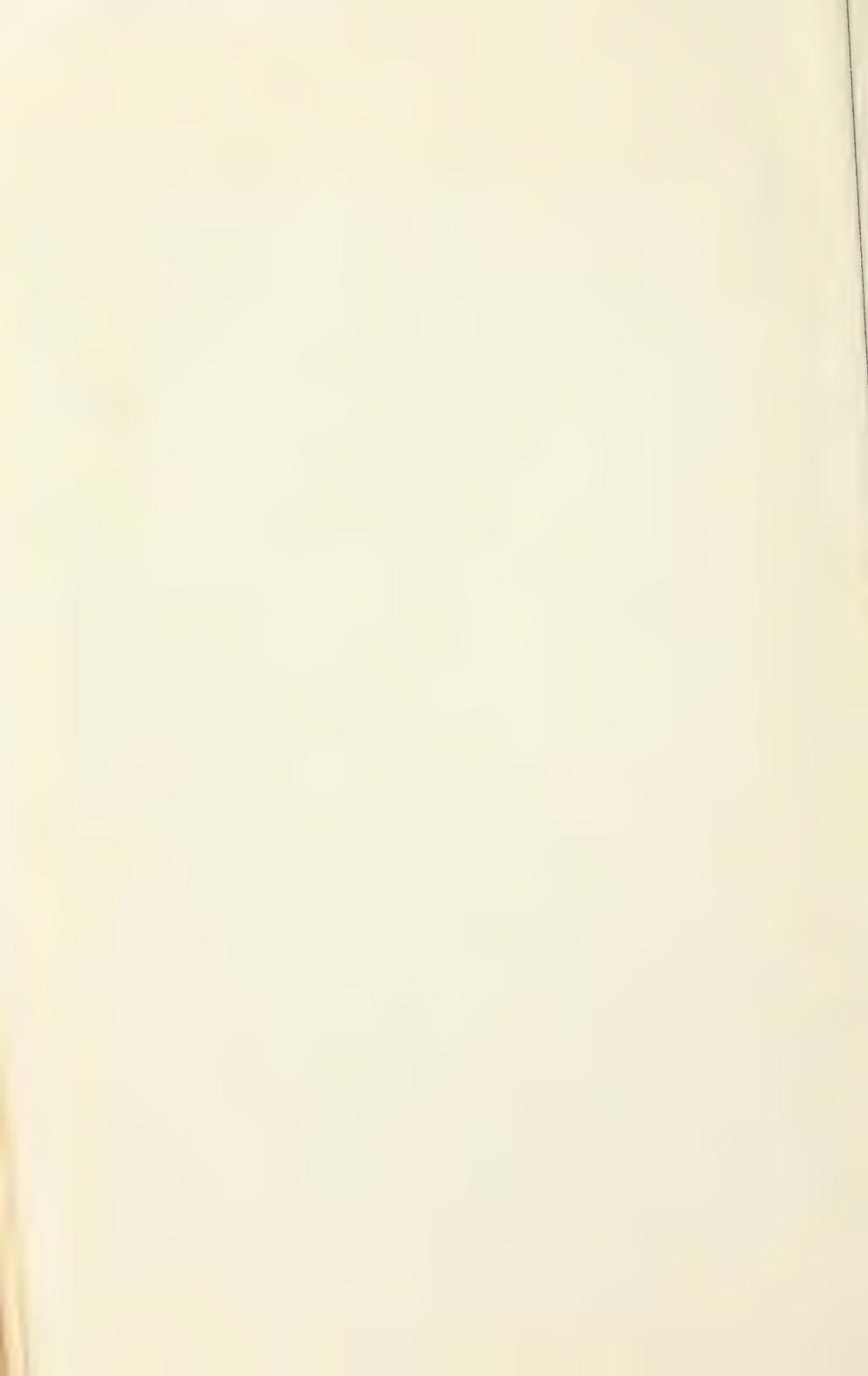
Other reservations were made from time to time, but as these reserves were set apart merely by order of the Minister, lands could be withdrawn therefrom by the same authority and it was considered advisable that a more permanent character should be given to the reservations. With that end in view it was decided by the Government that the reserves should be set apart by Act of Parliament. This has now been done and no lands can now be withdrawn from the reserves except by special Act of Parliament.

The purposes for which the reserves are established are to protect the headwaters of the streams and so ensure a constant water supply; to provide a supply of wood for the settlers, and to serve such additional beneficial purposes as may be brought about by the influence of large areas of forest, protecting the country from winds or other adverse climatic influences.

Of the reserves situated in Manitoba, the Turtle Mountain Timber Reserve covers a district of somewhat elevated land covered mainly by aspen and balsam poplar. It also includes a number of lakes and will serve the double purpose of being a pleasure resort and a source of supply for the wood and smaller timber required by the settlers. This reserve has been somewhat severely cut and part of it has been burnt. One serious difficulty in protecting it has been the fact that fires frequently came from south of the international boundary along which



Norway Spruce Wind-break protecting a Peach Orchard.





the reserve is located, and over which the Forest Ranger has no control.

The Riding Mountain, Duck Mountain and Porcupine Hills reserves, in the northern part of Manitoba, are all of the same general character. The land is high and broken with ravines. These tracts formed a part of the best wooded portion of the Province of Manitoba and have been lumbered over for a number of years. The principal species of trees are spruce, aspen and balsam poplar, white birch, tamarack and Manitoba or ash-leaved maple.

Some of the lands within these reserves are still held under timber license, and the timber limits are being operated at the present time. Part of these reserves, especially the Riding Mountain and Duck Mountain reserves, have been burnt over, the fires coming in mainly from the west side. There are however still considerable areas of mature green timber in these reserves. They will be a very important factor as the source of supply for timber for the settlers in these localities, and will also serve the purpose of protecting the headwaters of the streams. In fact the greater part of the streams flowing through the Province of Manitoba have their headwaters within these reserves.

Lake Manitoba West Reserve was timbered with spruce, poplar and tamarack. It has been largely denuded of timber.

Porcupine Reserve No. 2 is located in the Province of Saskatchewan and has been mentioned as a separate reserve but is contiguous to the one in Manitoba and is of practically the same character.

Moose Mountain and Beaver Hill reserves in Saskatchewan contain mostly aspen and balsam poplar. They are located in the prairie country and therefore are very important for the supply of the districts in which they are located. The settlers come from long distances to obtain wood for fuel and construction purposes from these reserves. They will also be very useful as summer resorts.

In the Province of Alberta there is a reserve at the western end of the Cypress Hills. This is in the middle of what is generally known as the semi-arid district of the West. There was considerable timber in the valleys of the western slopes of these hills, but it has nearly all been cut off although there is still a mill operating in this district. The timber is mainly *Pinus Murrayana*, and if it is given proper protection there will, so far as present indications show, be no serious difficulty about the natural reproduction of the forest.

The Cooking Lake Reserve in the same Province is situated southeast of Edmonton and includes a tract of lake and rough land. The land is not at all suited for agricultural purposes

but there has been considerable settlement in the vicinity and fires have run through most of the reserve. The timber is spruce and poplar.

The Kootenay Lakes Forest Reserve is on the eastern slope of the Rocky Mountains near the international boundary. The area is small and its chief value is as a park. There has been considerable prospecting for petroleum in the vicinity of this reserve.

In the Railway Belt in British Columbia most of the reserves established by the Act are in the Kamloops District which is the dry belt of British Columbia. This is the central portion of the Province and the rain coming from the ocean is precipitated on the mountains lying between the coast and the interior, with the result that the rainfall in the Kamloops District is small. These reserves have therefore been established mainly for the purpose of conserving the water supply. The hills covered by these reserves rise to a height of something like 6000 feet, and are generally too elevated to be of use for successful farming operations. Their influence on the flow of the streams is however very important for agricultural operations in the valleys below, as, in order to ensure successful agriculture, it is necessary to depend to a greater or lesser extent on the application of water to the land by artificial means. The principal species of trees found in these reserves are the Douglas fir and black pine (*Pinus Murrayana*).

The Donald Forest Reserve lying farther east in the Province of British Columbia is not so important for water supply but is in a splendid timber and scenic district.

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The Governor of West Virginia writing in support of the proposed establishment of the Appalachian Forest Reserve and the White Mountain Forest Reserve says: "In all mountain countries the destruction of the forests has been a destruction of the country. 'After the timber the flood.' The soil hardens like a slate roof and the water runs off. It is the amount of water which enters the soil, not the precipitation, which makes a region a garden or a desert. The soil is destroyed, the streams dwindle to nothing, or at times are irresistible torrents spreading devastation and terror along their courses. . . . In a denuded country the streams are yellow, the soil carried to the sea, navigation impeded thereby, water-power imperilled, food fish and other aquatic life killed and scenic beauty destroyed."

## DISPOSAL OF TIMBER ON THE DOMINION FOREST AND GAME RESERVES.

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The praiseworthy action of the Dominion Government in setting aside 5310 sq. miles as permanent forest reserves encourages the hope that the same progressive forestry will be followed not only in the protection but in the utilization of the forests on these reserves.

That large areas of public property should be given to speculators or even legitimate lumbermen for all time to come for the paltry consideration of a bonus based on the present value of the timber in a local and changing market seems hardly in keeping with good husbandry.

According to the system in vogue the Government sells, not only the present stand, but all succeeding stands so long as the limit holder pays the small ground rent of \$5.00 per sq. mile. The bonus may be looked upon as a speculative price paid for the control of public lands for an indefinite period and it is safe to say that it seldom, if ever, reaches the value of the present stand. A case has recently come under observation where a limit of 18 sq. miles was sold for \$176.04 and from which the limit holder says he cuts approximately 4,000,000 ft. B.M. per sq. mile or 72,000,000 ft. in all. Making all possible allowance for meadow land, burned-over land, muskegs, etc., he must have bought the timber for less than 1 c. per 1000 plus of course the royalty of 50c. per 1000. This lumber he sells at about \$15.00 per M.

The most objectionable feature of the present system is, however, the long tenure of the land granted to the licensee. With the rapid rise in the price of wood it seems only reasonable that the people of Canada should receive at least a share of this increase in value instead of having the timber sold at a 50 to 100 year old market price. Under the present system a limit holder may not be required to cut a stick and the growth of the timber and value accretion will more than pay the interest on the small initial investment and the ground rent. Such a limit holder would come under the class of speculators who are essentially non-producers and are a drawback to the industrial welfare of the country.

What we would suggest as a reform in the method of disposal of Crown Timber is the sale of timber on the stumpage basis with a limited time in which to remove the crop. From the standpoint of a forester a system such as outlined below would

not only be more effective in the preservation of the forests but be eminently more just to the people of Canada whose property is being sold.

In the first place no timber should be sold until it is mature, then it should be removed with as little delay as possible. Before being placed on the market the timber should be measured by the forestry department and a working plan formulated, for no set of rules can be suitable for all of the varying conditions found in Canadian forests. It might be advisable especially where the forest is chiefly for protection to mark all the trees to be cut. After measurement the timber could be advertised for sale stating the size of the block, quantity and conditions of the timber to be cut and the regulations regarding diameter limit, height of stump, disposal of debris, etc., which may be necessary.

The blocks should be small, rarely if ever over one township but in order not to discourage the erection of mills, operators should be assured that more blocks would be placed on the market when the timber on the first becomes exhausted.

The time allowed for removal should of course vary according to the size of the block and accessibility of the timber but in order that the Government receive what it should of the increase in value, the periods should not be more than ten years. At the end of that period the timber remaining uncut might be again put on the market or held by the Government as the silvicultural conditions suggest. In this way the revenue from the forests would be adjusted at least every ten years and be somewhat commensurate with the true value of the timber. At the same time the period should not be so short that the limit holder would be forced to cut when the market is dull, and he deserves a share of the unearned increment for his risk.

A reserve bid might be held by the Government in order to prevent the depression of the price below the actual value by lack of competition, and the licensee should be required to deposit bonds to the extent of say 30% to 40% of the value of the timber as estimated in the working plan, in order to ensure fulfilment of contract. The balance of the payments to be made annually as the timber is cut.

It would seem advisable that the Government, as landlord, should build and own permanent improvements such as the main trails, important dams and drains. In case of a change of licensees at the expiration of a lease disputes as to the value of temporary improvements could be decided by the Minister of the Interior.

The only Federal tax that the limit-holder should be required to pay is one-half of the cost of guarding his limit from fire in order that he may be interested in having this service effective.



If the timber is sold on the stumpage basis it will be necessary that every log be scaled and marked by Government scalers and a heavy penalty should be imposed for taking logs out without the Government mark. By this means the Government would have reliable first-hand information as to the cut and would not have to depend on the statement of the buyer.

The right to cancel the license at any time for non-fulfilment of contract, carelessness with fire, etc., should be reserved.

We would advocate the expansion of this system to the management of the limits already sold especially those within the forest and game reserves, giving the limit-holders ten years in which to prepare for the change and if necessary compensating them for any loss sustained by the change.

There is no doubt that the sale of timber on a stumpage basis with a limited time for its removal would be of great benefit to the country and we believe also that the lumbermen would find it advantageous since they would know that they were bidding on and would pay only for what they cut. The risk of loss from fire or encroachment of settlers would be removed and they would be working on a simple direct business proposition.

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Effective administration in 1905 reduced the burned area on national forest reserves in the United States to one-fourth of what it was in 1904. The forest reserves came under the administration of the Forest Service, February 1st, 1905, and the new administration and regulations have worked wonders in the safe-guarding of the forests. All the reserve officers, except forest guards, are civil-service employees. Their salaries range from \$720 to \$2,500. Every forest supervisor is authorized in person or through a subordinate to hire temporary men, purchase material and supplies and pay for their transportation from place to place to extinguish a fire. Forest rangers are required to report monthly, and at the end of the year the supervisor submits an annual fire report to the Washington office.

## THE SCOTCH PINE (*PINUS SYLVESTRIS*) IN CANADA.

BY W. T. MACOUN, HORTICULTURIST, EXPERIMENTAL  
FARM, OTTAWA.

At the Central Experimental Farm, Ottawa, there are four European trees which are more prominent than any other exotic trees in hardiness and vigor, and which appear to thrive equally as well as native species. These are the Norway Maple (*Acer platanoides*), the European Larch (*Larix Europæa*), the Norway Spruce (*Picea excelsa*), and the Scotch Pine (*Pinus sylvestris*). Every spring the bare ground, and even the lawns, are covered with seedlings of the Norway Maple springing up where the seed has fallen during the previous autumn, showing how rapidly this tree would establish itself were it permitted to do so. The European Larch succeeds almost equally as well on the high land as in low places; in sandy soil as in clay soil, and is one of the most rapid growing trees on the Experimental Farm. The Norway Spruce is the most rapid growing evergreen which has been tested and also succeeds well in a great variety of soils.

The Scotch Pine, or Northern Pine (*Pinus sylvestris*), to which we wish to draw especial attention in this article, also succeeds well in soils varying from heavy clay loam to sandy loam. It is a rapid grower and very hardy and may prove a useful species for more extensive planting in Canada.

The Scotch Pine is a native of northern Europe and northern and western Asia, and for timber purposes is to European countries what the White Pine is to Canada. The timber is largely exported from Europe to England and is known in commerce under a variety of names, among the principal being Northern Pine, Red Fir, Yellow Fir, Dantzic Fir, Riga Fir, Swedish Fir and Norway Fir, many of these names originating from the ports of shipment. This species of pine is, however, very variable, both in general appearance and in the character of the wood, and marked differences are found in the timber from different parts of northern Europe.

The Scotch Pine is more nearly related to our native Red Pine (*Pinus resinosa*) than to the White Pine (*Pinus Strobus*), although it bears little resemblance to either. The leaves of the tree are bluish green, from two to three inches in length and are more or less twisted. They grow in pairs. The cones, which are about two inches long, are borne either singly or in clusters of two or three on short stalks. The timber is yellowish or

whitish, sometimes slightly tinged with red, is soft and readily worked. Owing to the variability of this species, care should be taken when buying seed, as the ease with which seed can be procured from the dwarf or scrubby forms makes it more profitable for those who gather it to get it from such sources, and the trees grown from such seed are not likely to be as good as those from tall, straight trees.

Of the recognized brands of Scotch Pine timber which are exported from Europe the Dantzic Fir is the best. It is grown principally in Prussia and Prussian Poland and the neighboring borders of Russia. The trees in these districts reach a height of 70 to 100 feet. The timber is used for much the same purposes as the White Pine and is employed in the construction of buildings, for flooring, rafters, joists, etc. It is used much in ship building, in the construction of bridges, and is also used for railway sleepers.

The Riga Pine is another form of *Pinus sylvestris*, taking its name from the port of shipment in Russia and produced in the interior of Russia. It is a more upright-growing tree than the Dantzic Fir and usually makes a timber freer from knots. It is, however, not so generally sound at the heart as the Dantzic, and hence is not so good for planks and boards. It is, however, but for this defect, almost equal to the Dantzic Fir and it is said that in ordinary specifications for building either Dantzic or Riga may be used, showing that they are regarded as of about equal value.

Timber inferior to the Dantzic and Riga Firs is produced in Sweden and Norway, and a considerable quantity is annually exported from the former country to England, and some also from the latter. These are known as Swedish and Norway Firs. The Scotch Pine, or Scotch Fir, as it is known in Great Britain, is produced there in limited quantities, but of good quality. In some parts of the United States the Scotch Pine has succeeded very well and is now being planted there in large numbers for timber purposes.

In 1887 when tree planting was begun at the Central Experimental Farm, Ottawa, the Scotch Pine was among the species which were planted in the nursery there, and in the following year 424 trees were planted in two blocks. Part of these trees were planted 10 by 10 feet apart and part 5 by 5 feet apart. The trees when planted were about 18 inches in height. The soil was sandy loam mixed with a little gravel and rather wet. The plantation, with the trees 5 by 5 feet apart, was cultivated until 1892, while where the trees were 10 by 10 feet apart cultivation was continued for two years longer. In the autumn of 1905 the trees 5 by 5 feet apart averaged 29 feet in height, with a diameter of  $4\frac{1}{4}$  inches, four feet six inches from the ground; and those 10 by

10 feet apart, a height of 27 feet, with a diameter of  $5\frac{1}{2}$  inches. The trees planted the closer distance are straighter than those planted further apart, and at the wider distance there has been much greater injury to the tops of the trees by wind. The branches of the trees 5 by 5 feet have died to a height of 12 to 15 feet, while those 10 by 10 feet apart are dead for only 9 to 12 feet.

In 1888, after the plantations in the forest belts were made, 636 trees of Scotch Pine remained in the nursery. These were left undisturbed until 1893, when they were thinned out to an average distance of  $2\frac{1}{2}$  feet in the row, the rows being 3 feet apart. Further thinning was done from time to time of the trees which became suppressed by the stronger growing specimens. In the autumn of 1905 these trees averaged 30 feet in height, with a diameter of 3 5-6 inches four feet six inches from the ground. The trees in this plantation are very straight with a much smaller proportion of injured tops than in either of the others. The branches have died to a height of 20 to 25 feet. These trees are growing in light, gravelly well drained soil.

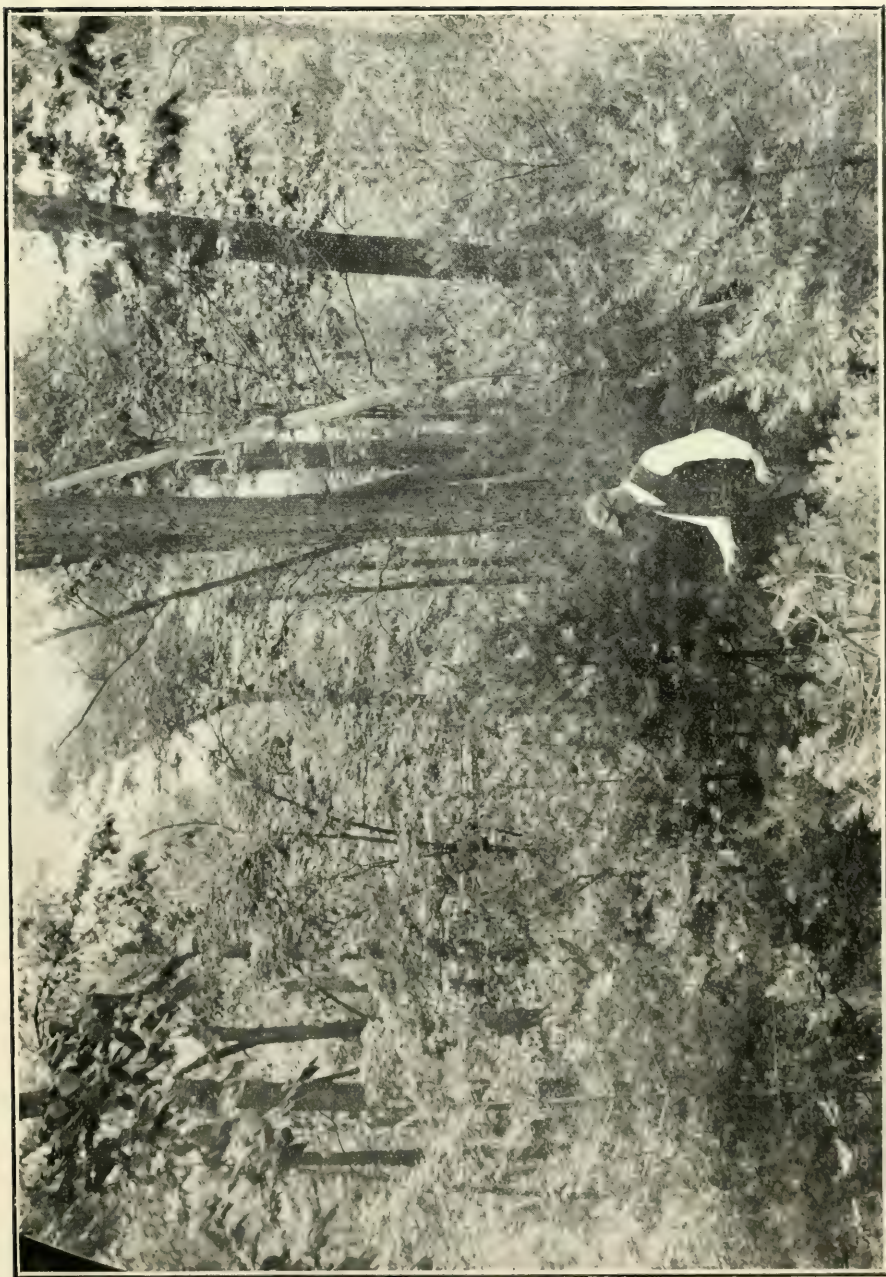
In 1888 a number of Scotch Pine were also planted in a mixed plantation of evergreen and deciduous trees, 10 by 5 feet apart. The soil in this plantation is mostly clay loam. The trees averaged in the autumn of 1905, 27 feet 8 inches in height, with a diameter of 7 inches.

White Pine (*Pinus Strobus*) planted in light sandy loam soil with gravel in 1889 when 8 to 10 inches in height, 5 by 5 feet apart, averaged in the fall of 1905,  $28\frac{1}{2}$  feet in height, and  $4\frac{1}{4}$  inches in diameter, and those 10 by 10 feet apart 28 feet in height and  $6\frac{1}{4}$  inches in diameter.

It will be seen that in soil very suitable for White Pine the growth has been about the same as that of Scotch Pine. There are no plantations of White Pine on clay loam at the Experimental Farm, but the individual trees which are growing on clay loam do not show the vigour of the Scotch Pine. It is this adaptability of the latter species to so many conditions of soil and moisture that would make it appear to be a desirable species for planting, especially in soils not very suitable to White Pine.

An interesting feature of the experiments with Scotch Pine at the Central Experimental Farm is the growth of volunteer seedlings among the older trees. If there is any one thing which shows the adaptability of a species to its surroundings it is its reproduction from seed. No other exotic conifer has so far reproduced itself in this way at Ottawa. The Scotch Pine began to fruit in 1896, eight years after planting, and seedlings 6 years of age are now growing under and near these trees. Where the conditions have been most favourable, these seedlings are very abundant.





Reproduction of White Pine in mixed hardwood forest—from 3 or 4 seed trees to the acre



The Scotch Pine is proving quite hardy at Indian Head, Sask., and may prove a very useful tree for the prairie provinces. The following quotation from a letter received from Mr. Angus MacKay, Superintendent, Experimental Farm, Indian Head, gives his experience with this tree. "The Scotch Pine on the Farm are very hardy and doing extra well. The 3 oldest are 30 feet high and the largest of the 3 is 31 inches around 2 feet from the ground. These were planted in 1889, but I do not know how old they were at the time (probably three or four years old). You will understand that in the early years the seasons were very dry, and little or no growth was made during that time. Lately, they are growing equal to any other variety and surpassing several."

The value of this tree for timber purposes in Canada remains to be seen, but owing to its rapid growth in so great a variety of soils it should prove useful for many purposes. The fact that it fruits so early and heavily may be an indication of a short life here, but some of our native trees which reach a large size and a great age here fruit early also.

As an ornamental tree, the Scotch Pine is not nearly so valuable as the native White Pine, not being so attractive in colour of foliage, nor as graceful in form. It is a spreading grower and as the leader is frequently destroyed by wind when the tree is grown as an individual specimen it becomes still more spreading. The Riga Pine, a variety of the Scotch Pine, is much more graceful, being more upright in growth and apparently not suffering so much from injury by wind.

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The August issue of *Forestry and Irrigation* contains statistics on the timber used in the anthracite coal mines of Pennsylvania. Reports were received from 83 per cent. of the anthracite tonnage of the United States and from these the remaining 17 per cent. was computed. The results of the tabulation show that 121,565,000 feet board measure of sawed timber and 52,440,000 cubic feet of round timber were used during 1905. The total value of the round and sawed timber combined was \$5,310,000. Of the species used for round timber, yellow pine furnishes one-half. Oak ranks second. For sawed timber, hemlock holds first place in quantity, with yellow pine ranking second.

## THE TAMARACK GROWTH IN THE EASTERN TOWNSHIPS OF THE PROVINCE OF QUEBEC.

THOMAS W. FYLES, D.C.L., F.L.S.

It is a law of nature that no particular growth of plants shall hold possession of the land in perpetuity. Sooner or later destructive agents will break in upon the scene. Insect depredators, drought, fire, storm and flood—*these*, and the axes of the lumbermen, make clearances for occupation by the settler, or for Nature's re-planting. In the latter case we find that the new growth is, generally speaking, different from the old. The following affords a curious exemplification of this fact:—

In 1842, when the Ashburton Treaty was made, a strip, 60 feet wide, was cut along the border, through the tamarack swamps that extend from Canada into New Hampshire and Maine. This strip is now filled up with a new growth; but the forester knows directly when he strikes the line, for he finds a belt in which the poplar (*Populus tremuloides*), the red cherry (*Prunus Pennsylvanica*), and the Moosemissie (*Pyrus Americana*), are growing—the seeds of the first having been carried by the wind into the Boundary, when newly cleared; and those of the last two, by birds.

Thirty years ago it was a fine sight to look, from an elevation, upon the vast area of swamp land, extending through Bury, Lingwick, Hampden, Ditton, and far away. Tamaracks from two feet to two and a half feet in diameter, were the lords of this forest-land. Today: I have the authority of Mr. Ayton Cromwell and Mr. C. C. Lusk, of Cookshire, and Mr. C. H. Ward, of Bury—all experienced foresters—for stating, that not a single first-growth tamarack is to be found in the whole section. And like testimony comes to me from Mr. John D. Johnson, of St. Thomas, and Mr. E. W. Brewster, of Compton, in regard to the districts with which they are respectively acquainted.

How was the destruction brought about? By an agent seemingly insignificant and wholly unexpected—a four-winged fly, belonging to the order, HYMENOPTERA, and named by Hartig, *Nematus Erichsonii*.

This fly is only about eight-tenths of an inch in expanse of wings, and four-tenths in length of body. Its color is black; but it has a broad orange-red band round the abdomen. Its wings are clear, with dark veins, and a conspicuous costal spot on *stigma*.



In the larval stage—which is the destructive stage—the species is a green caterpillar of no great size, having a black head. When it is “full-fed,” it creeps into some retreat, and spins a compact, brown cocoon, about half an inch in length.

It was in the pupal stage, probably, and amongst the roots of young plants of Norway Spruce, that the species was brought to the nurseries of Massachusetts, about the year 1880.

The first notice of the arrival of the *Nematus* in Canada was given by myself, and will be found on the 17th page of the Report of the Ent. Soc. of Ont. for 1883.

When the creatures came to us, they came in their strength—“In numbers numberless.” The *Nematus* Raid, as it was called, was a phenomenon that they who witnessed are not likely to forget. That creatures seemingly so insignificant, brought unwittingly from a country so far away, should, by force of numbers, be able to strip the vast forest of tamarack of its verdure, and leave the trees in a dying state was truly marvellous!

I last saw the creatures in activity about ten years ago, in a grove of young tamarack near the old St. Henri Road, in Levis County. The trees were about twenty feet high; and here and there amongst them was a small colony of *Nematus* larvæ. The grove mentioned has lately been felled, and the land it occupied turned into a pasture.

The *Nematus* larvæ had a preference for the finest growths. The smaller trees of the time were not at first so badly treated by them; and these lingered on, making brave efforts at recovery; but even these have, for the most part, now succumbed. Probably the drought of 1903 gave the finishing blow to them.

Mr. E. B. Brewster tells me that half a mile from Compton Village, there is a tamarack swamp about a mile long and one-eighth of a mile wide. The largest trees in it are ten or twelve inches in diameter. Of all the trees in the swamp, probably 75 per cent are dead, and about 15 per cent. shew some signs of feeble life in tufts of sprouts from the stem. The only apparently healthy trees are on the borders of the swamp, and form a mere narrow fringe to it, one or two trees deep.

Of the dead trees in this swamp, some are only “rampikes” denuded both of branches and bark. To others the branches still cling. Here and there, among the dead trees, a few balsams (*Abies balsamea*) and cedars (*Thuja occidentalis*) are springing up.

When I visited the swamps in Bury in 1891 the rot had struck into the dead trees for two or three inches. For an account of this visit, and a calculation of the damage done by the *Nematus* see the Report of the Entomological Society of Ontario for 1891, page 28.

When the Rutland Railway into Canada was in contemplation, dead tamarack trees lay so thickly in the swamp half way between Alburgh and Noyan that they had to be hauled out of the way, before the survey for the line could be effected. This was in the fall and winter of 1898-9. The authority for this statement is Mr. Alanson Vosburgh, *per* Miss May G. Johnson, of Miranda, P.Q.

In the part of Bury where I saw Maddock's gang getting out the knees for vessels, in 1891, the land has been brought under cultivation.

A few notes to tell further of the kinds of trees that are springing up in place of the tamarack may be desirable.

In the Ditton Swamp, which is about three miles long and a mile broad, the tamaracks, young and old, are all dead. Spruce is taking their place.

In the Spalding Hill Swamp, in Eaton Township, cedar, poplar and some young tamarack are growing.

In the Harrison Neighbourhood, in Bury Township, in parts where the soil is sandy, white birch and a few balsams are growing: on wet clay, the poplar appears.

In Long Swamp, which extends through Newport, Hampden, and over to Lingwick, spruce and balsam are growing.

To those who would see a tamarack swamp in its infancy, I would recommend a visit to "The Gomin" which lies to the west of Bergerville, about 4 or 5 miles from Quebec. In the early summer it is all aglow with rhodora, sheep-laurel, orchids and pitcher plants. When I first saw it, in 1886, it was a broad expanse of sphagnum, unoccupied, save on its outskirts, by any larger plants than those I have mentioned. I re-visited the swamp on the 10th of July last, and found that it was dotted all over with young tamarack from a foot to fifteen feet high. On the borders of the swamp near the cultivated land there were tamaracks twenty-five feet high or more.

Doubtless, if left undisturbed, the growth on this tract will, in process of time, become a forest. And so—

"The old order changeth and giveth place to new."

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The State Fire Warden estimates that in the State of Washington 42,000,000,000 feet of standing timber has been destroyed by fire, and only 30,000,000,000 logged off. Forest fires, according to this estimate, have destroyed twelve billion more feet of timber than has been cut and sold.

## A NEW LOG RULE.

In the last issue of the Forestry Quarterly there appeared a new log rule called by the author, Dr. J. F. Clark, the International Log Rule.

This rule is undoubtedly the most nearly accurate that has yet been proposed and it is to be hoped that it will soon become generally adopted. It is almost incredible that the Doyle and Scribner Rules should have been kept in use so long since they are so glaringly inaccurate, especially for the smaller sizes of logs. When first brought out they were approximately correct for the sizes of logs and methods of milling then in vogue, but now, when smaller logs are used and greater economy exercised in milling they under-scale frequently 100 to 140 per cent.

The International Rule was first worked out mathematically and after allowances had been made for taper, shrinkage in seasoning, saw kerf, and crook it was tested at a mill in the Ottawa Valley on a large number of logs, just as they happened to come to the mill.

As the following table shows, the error of this rule is negligible while those of the other rules used were very serious.

Over-run (+) or under-run (-) of Saw Cut, as compared with scale by

DIAM OF LOGS.	NUMBER OF LOGS.	DOYLE.	SCRIBNER.	CHAMPLAIN.	INTERNAT'N'L 1-8.
6-8	28	+143%	+33%	10.3%	+2.6%
7-9	54	+115%	+35%	+8.8%	+2.3%
8-12	101	+72%	+34%	+7.1%	+0.0%
10-17	104	+45%	+23%	+4.7%	-1.1%
18-20	90	+24%	+14%	+6.7%	+0.5%
21-24	126	+18%	+14%	+5.2%	+1.1%
25-33	31	+10%	+9%	+3.3%	-0.5%

The formula upon which this rule is based is  $(D^2 \times .22) \div .71$  D. The measurement is made at the small end of the log and the content is figured on the basis of an 8 ft. log in order to prevent the injustice of disregarding the large amount of material which can be cut from the slabs on a long log.

It includes all square edged boards which have a content of 2 feet board measure or over which can be cut from sound logs; in other words, boards which do not fall below the following dimensions:—

3 inches wide and 8 feet long.	5 inches wide and 5 feet long.
4 " " " 6 " "	6 " " " 4 " "

## THE INTERNATIONAL LOG RULE.

Formula:  $(D^2 \times .22) - .71D$  for 4-foot sections.Taper Allowance:  $\frac{1}{2}$  inch per 4 feet lineal.Standard scale for saws cutting a  $\frac{1}{8}$ -inch kerf.

Dia.	LENGTH OF LOG IN FEET.														Dia.
	8	9	10	11	12	13	14	15	16	17	18	19	20		
3										5	5	5	5	3	
4			5	5	5	5	5	5	5	10	10	10	10	4	
5	5	5	5	5	10	10	10	10	15	15	15	15	20	5	
6	10	10	10	15	15	15	20	20	20	25	25	30	30	6	
7	15	15	15	20	20	25	25	30	30	35	35	40	45	7	
8	20	20	25	25	30	35	35	40	45	45	50	55	60	8	
9	25	30	30	35	40	45	50	50	55	60	65	70	75	9	
10	30	35	40	45	50	55	60	65	70	75	85	90	95	10	
11	40	45	50	55	65	70	75	80	90	95	105	110	115	11	
12	50	55	65	70	75	85	90	100	105	115	125	130	140	12	
13	60	65	75	85	90	100	110	120	130	140	145	155	165	13	
14	70	80	90	100	110	120	130	140	150	160	175	185	195	14	
15	80	90	105	115	125	140	150	160	175	185	200	215	225	15	
16	95	105	120	130	145	160	170	185	200	215	230	245	260	16	
17	105	120	135	150	165	180	195	210	225	245	260	275	295	17	
18	120	135	155	170	185	205	220	240	255	275	295	310	330	18	
19	135	155	175	190	210	230	250	270	290	310	330	350	370	19	
20	150	170	195	215	235	255	275	300	320	345	365	390	410	20	
21	170	190	215	235	260	285	305	330	355	380	405	430	455	21	
22	185	210	235	260	285	315	340	365	390	420	445	475	500	22	
23	205	230	260	285	315	345	370	400	430	460	490	520	550	23	
24	225	255	285	315	345	375	405	440	470	500	535	565	600	24	
25	245	275	310	345	375	410	445	475	510	545	580	615	650	25	
26	265	300	335	370	405	445	480	520	555	595	630	670	705	26	
27	290	325	365	405	440	480	520	560	600	640	680	725	765	27	
28	310	350	395	435	475	520	560	605	645	690	735	780	825	28	
29	335	380	425	470	510	560	605	650	695	740	790	835	885	29	
30	360	405	455	500	550	600	645	695	745	795	845	895	950	30	



Dia.	LENGTH OF LOG IN FEET.													Dia.
	8	9	10	11	12	13	14	15	16	17	18	19	20	
31	385	435	485	540	590	640	695	745	800	850	905	960	1015	31
32	410	465	520	575	630	685	740	795	850	910	965	1025	1080	32
33	440	495	555	610	670	730	790	850	905	970	1030	1090	1150	33
34	470	530	590	650	715	775	840	900	965	1030	1095	1160	1225	34
35	495	560	625	690	755	825	890	955	1025	1095	1160	1230	1300	35
36	525	595	665	735	800	875	945	1015	1085	1160	1230	1305	1375	36
37	560	630	705	775	850	925	1000	1075	1150	1225	1300	1380	1455	37
38	590	665	745	820	895	975	1055	1135	1210	1295	1375	1455	1535	38
39	620	705	785	865	945	1030	1110	1195	1280	1365	1450	1535	1620	39
40	655	740	825	910	995	1085	1170	1260	1345	1435	1525	1615	1705	40
41	690	780	870	960	1050	1140	1230	1325	1415	1510	1605	1700	1795	41
42	725	820	915	1010	1100	1200	1295	1390	1490	1585	1685	1785	1885	42
43	760	860	960	1060	1155	1260	1360	1460	1560	1665	1770	1870	1975	43
44	800	900	1005	1110	1215	1320	1425	1530	1635	1745	1855	1960	2070	44
45	835	945	1055	1160	1270	1380	1490	1600	1715	1825	1940	2050	2165	45
46	875	990	1100	1215	1330	1445	1560	1675	1790	1910	2030	2145	2265	46
47	915	1035	1150	1270	1390	1510	1630	1750	1870	1995	2120	2240	2365	47
48	955	1080	1205	1325	1450	1575	1700	1830	1955	2085	2210	2340	2470	48
49	1000	1125	1255	1385	1510	1645	1775	1905	2040	2170	2305	2440	2575	49
50	1040	1175	1310	1440	1575	1715	1850	1985	2125	2265	2400	2540	2680	50
51	1085	1225	1360	1500	1640	1785	1925	2070	2210	2355	2500	2645	2790	51
52	1125	1275	1420	1565	1710	1855	2005	2150	2300	2450	2600	2750	2905	52
53	1170	1325	1475	1625	1775	1930	2085	2235	2390	2545	2705	2860	3015	53
54	1220	1375	1530	1690	1845	2005	2165	2325	2485	2645	2810	2970	3135	54
55	1265	1430	1590	1755	1915	2080	2245	2410	2580	2745	2915	3085	3250	55
56	1315	1480	1650	1820	1985	2160	2330	2500	2675	2850	3025	3200	3375	56
57	1360	1535	1710	1885	2060	2240	2415	2595	2770	2955	3135	3315	3495	57
58	1410	1590	1775	1955	2135	2320	2505	2685	2870	3060	3245	3435	3620	58
59	1460	1650	1835	2025	2210	2400	2590	2780	2975	3165	3360	3555	3750	59
60	1510	1705	1900	2095	2290	2485	2680	2880	3075	3275	3475	3680	3880	60

From a large number of measurements it has been found that the average taper does not vary greatly with different species or in different localities, and in this rule a taper of 1 inch in 8 feet has been allowed.

The loss from saw kerf varies of course with the size of the saw, but as his standard Dr. Clark has taken 1-8 inch as the width of the kerf. He also allows 1-16 inch as a factor of safety for shrinkage in seasoning.

It is possible, with very little difficulty, to make corrections to suit local conditions of taper, crook, kerf, or defects. The allowance for rot is left as it should be to the judgment of the scaler.

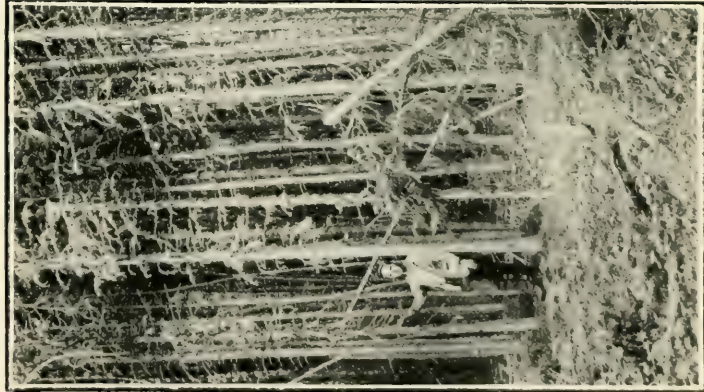
Coming as it does from a forester who is familiar not only with the mathematical side of the question, but with practical lumber and milling operations, the introduction of this rule is a step towards a reform which is daily becoming more imperative and it should receive the careful consideration of all those who are interested in the exploitation of the forests. We especially recommend it for the consideration of those who have charge of the sale of Government timber.

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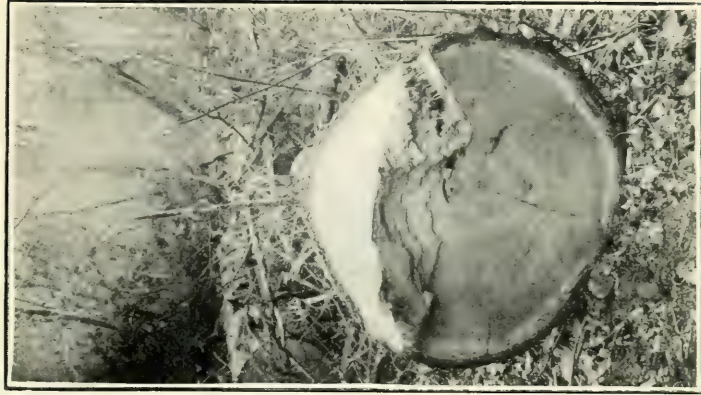
Timber owners in the State of Washington have raised a fund for protection against fire. No state appropriation was made and the principal lumbermen got together and subscribed \$8,133, which was placed at the disposal of the State Board of Forest Commissioners, and the State Fire Warden to be used in preventing and fighting fire during the dry season. The chief menace to the forests in Washington has been the operation of engines not equipped with proper meshing, as required by law. An attempt will be made this year to have the law strictly enforced. The netting of spark arresters used in coal burning engines should be not less than three mesh No. 12 wire to the inch, and the netting of spark arresters on wood burning engines should be not less than six mesh No. 16 wire to the square inch.

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Many of the mill companies in Washington have asked the Forest Commissioners to appoint their woods foremen forest rangers, to serve without compensation from the State. These men have full authority in the fighting of forest fires in their various districts.



80-year old Spruce growing too  
densely to do well in Riding  
Mountain Forest and  
Game Reserve.



White Spruce grown mixed with  
Aspen and Balsam in Riding  
Mountain Forest and  
Game Reserve.





## AN ACT RESPECTING FOREST RESERVES.\*

BILL No. 47.

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Whereas it is expedient that reserves of Dominion lands in the provinces of Manitoba, Saskatchewan, Alberta and British Columbia should be made in order to protect and improve the forests for the purpose of maintaining a permanent supply of timber, to maintain conditions favorable to a continuous water supply, and to protect, so far as the Parliament of Canada has jurisdiction, the animals, fish and birds within the respective boundaries of such reserves, and otherwise to provide for the protection of the forests in the said provinces: Therefore, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as the Dominion Forest Reserves Act.

2. All Dominion lands within the respective boundaries of the reserves mentioned in the schedule to this Act are hereby withdrawn from sale, settlement and occupancy under the provisions of the Dominion Lands Act, or of any other Act, or of any regulations made thereunder with respect to mines or mining or timber or timber licenses or leases or any other matter whatsoever, and after the passing of this Act no Dominion lands within the boundaries of the said reserves shall be sold, leased or otherwise disposed of, or be located or settled upon, and no person shall use or occupy any part of such lands, except under the provisions of this Act or any regulations made thereunder.

3. The said reserves are hereby set apart and established and shall hereafter be and be known as Dominion Forest Reserves, for the maintenance and protection of the timber growing or which may hereafter grow therein, and for the protection, so far as the Parliament of Canada has jurisdiction, of the animals and birds therein, and the fish in the waters therein; but subject to such regulations as may be made under the provisions of section 4 of this Act.

4. The said reserves shall be under the control and management of the Superintendent of Forestry, or such other person as is from time to time in charge of forestry for Canada, subject to the direction of the Minister of the Interior; and the Governor in Council may make regulations, not inconsistent with the provisions of this Act, for the maintenance, protection, care,

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\* Passed by House of Commons, 1906.

management and utilization of such reserves, and of the timber and minerals therein, and, so far as the Parliament of Canada has jurisdiction, of the animals and birds therein and the fish in the waters therein, and for the prevention of trespass thereon.

ii. Such regulations shall be published for four consecutive weeks in the CANADA GAZETTE, and shall thereupon have the same force and effect as if herein enacted, and the said regulations shall be laid before Parliament during the first fifteen days of the then next session thereof.

5. The Minister of the Interior may appoint forest rangers for the purpose of carrying out the provisions of this Act, and every such ranger shall, for the purpose of this Act, have within the district for which he is appointed all the powers of a justice of the peace.

6. Every such ranger shall, before acting in that capacity, take and subscribe before a judge or notary public, or the Superintendent of Forestry or other person in charge of forestry for Canada, an oath in the words following:—

“I, A. B., a forest ranger in and for the district or territory described in my appointment, do solemnly swear that, to the best of my judgment, I will faithfully, honestly and impartially fulfil, execute and perform the office and duty of such forest ranger according to the true intent and meaning of the Dominion Forest Reserves Act, and of all regulations made or to be made thereunder; so help me God.”

7. The Governor in Council may exchange for any land within any such reserve, the title to which is not vested in the Crown in the right of Canada, available Dominion lands situated outside the boundaries of such reserves, and where necessary, may make compensation upon such exchange, and a copy of every order in council authorizing such exchange shall be laid before Parliament during the first fifteen days of the then next session thereof.

8. Where a road allowance within the boundaries of any such reserve has been vested in the Crown in the right of the province in which it is situated, or has passed under the control of the executive authorities of the province, such road allowance may, with the consent of the Lieutenant Governor of the province in Council, be included in and form part of such reserve and may be closed by any fence which may be erected for the enclosure of such reserve, or any part thereof.

9. Notwithstanding anything in this Act, the Governor in Council may cause to be established through and over any such reserve such roads as are necessary for the convenience of the public, and nothing in this Act or in any regulation made there-

under shall prevent the proper use of such roads by bona fide travellers or by others requiring to cross such reserve in the pursuit of their ordinary business or calling, but nothing in this section shall operate to withdraw such roads from the reserve.

10. During the construction of any railway passing through Dominion lands, the Minister of the Interior may appoint such forest rangers as he deems necessary for the protection from fire of the forests along or adjacent to such railway, and it shall be the duty of every such ranger to enforce the provisions of this Act and any regulations made thereunder, and of any other Act either of the Parliament of Canada or of the province in which such lands are situated, when and in so far as such acts or any regulations made thereunder relate to the prevention of fires and are in force in the district for which such ranger is appointed; and for such purposes and within a tract of five miles on either side of such railway every such ranger shall have all the powers of a justice of the peace, and one-half of the expenses incident to and connected with such fire ranging shall be a debt due to the Crown from the person constructing such railway and shall be payable upon demand of the Minister of the Interior, and may be recovered at the suit of the Crown in any court of competent jurisdiction.

ii. The Governor in Council may make such regulations as he deems necessary or expedient to give full effect to the object and intention of this section.

11. The Governor in Council may secure from the holder of any title to or interest in any land within the limits of a forest reserve a waiver in writing of the exemption of such land from the provisions of any regulations made under this Act for the prevention of trespass and the protection of game, and, where necessary, may make compensation therefor, and from the date of such waiver, and to the extent therein agreed upon, this Act and the regulations made thereunder shall apply to such lands.

12. Except as hereinafter otherwise provided, this Act shall not apply to lands within the boundaries of any reserve set apart and established under the provisions thereof the title to which is not vested in the Crown in the right of Canada at the date of the passing of this Act, and shall not apply to any lands within such boundaries which at that date are held under lease or are subject to a license to cut timber or to any other right or interest therein or affecting the same, so long as such lease or license remains in force or such right or interest continues to exist; Provided that nothing contained in any lease or license heretofore granted shall be deemed to prevent the opera on

of this Act or any regulation made thereunder with respect to the protection of game, the prevention of fires and the preservation and reproduction of timber; and provided further that when any land upon which a lease or license to cut timber has been granted does not contain, or has become denuded of, merchantable standing timber, such land may thereupon be withdrawn from such lease or license upon notice to the lessee or licensee, and such land shall thenceforth be subject to all the provisions of this Act and of any regulations made thereunder.

13. Neither the Governor in Council nor the Minister is authorized or empowered for the purposes of this Act to expropriate, purchase or acquire for compensation any right or interest held under license to cut timber.

ii. In the event of the Governor in Council or the Minister being hereafter authorized or empowered for the purposes of this Act to expropriate, purchase or acquire any such right or interest, the compensation payable therefor shall not be assessed or determined, either judicially or by agreement, at any larger or increased amount by reason of the land covered by such right or interest being situate in any forest reserve created under the authority of this Act.

14. Any person violating any provision of this Act or any regulation made thereunder shall, in addition to any civil liability thereby incurred, be liable, on summary conviction, to a penalty of not more than one hundred dollars, and in default of immediate payment of such penalty and of the costs of prosecution such person may be imprisoned, with or without hard labour, for any term not exceeding six months.

#### SCHEDULE.

The Dominion Forest Reserves set apart and established under the provisions of section 2 of the Dominion Forest Reserves Act, and the boundaries of each of such reserves.

#### PROVINCE OF BRITISH COLUMBIA.

1. The Long Lake Dominion Forest Reserve, in the railway belt, in the province of British Columbia, consisting of the west half of township 17, range 18; township 17, range 19, except sections 5, 6, 7, 8, 17, 18, 19 and 20 of the said township; the west half of township 18, range 18; township 18, ranges 19 and 20; the south half of township 19, range 19; township 19, range 20, all west of the 6th meridian, and containing 190 square miles, more or less.

2. The Monte Hills Dominion Forest Reserve, in the said railway belt, consisting of the north-west quarter of township 16, range 14; the north half of township 16, range 15; sections



24, 25, 26, 27, 34, 35 and 36 in township 16, range 16; the west half of township 17, range 14; township 17, range 15, and the east half of township 17, range 16; all west of the 6th meridian, and containing 106 square miles, more or less.

3. The Martin Mountain Dominion Forest Reserve, in the said railway belt, consisting of sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20 and 21 of township 19, range 13; and sections 1, 2, 3, 10, 11 and 12 of township 19, range 14; all west of the 6th meridian, and containing 18 square miles, more or less.

4. The Niskonlith Dominion Forest Reserve, in the said railway belt, consisting of township 21, ranges 14 and 15; the east half of township 21, range 16, except that part included in Kamloops Indian Reserve; township 22, range 14, west of the 6th meridian; and containing 124½ square miles, more or less.

5. The Tranquille Dominion Forest Reserve, in the said railway belt, consisting of township 22, ranges 18 and 19; that part of township 23, range 18, included in the said railway belt; township 23, range 19; that part of township 24, range 19, included in the said railway belt; all west of the 6th meridian, and containing 149 square miles, more or less.

6. The Hat Creek Dominion Forest Reserve, in the said railway belt, consisting of township 18, range 26; township 18, range 27, except the south-west quarter of the said township; that part of the north half of township 18, range 28, within the said railway belt, not included in the Indian Reserve; the west half of township 19, range 25; the east half of township 19, range 26; township 19, range 27; the easterly first tier of sections in township 19, range 28; that part of the south-west quarter of township 20, range 25, not included in the Cornwall Ranch; the south-east quarter of township 20, range 26; the west half of township 20, range 27; the easterly first tier of sections in township 20, range 28; section 4 of township 22, range 27; that part of the west half of township 21, range 27, within the said railway belt and not included in the Indian Reserve; all west of the 6th meridian; and containing 206 square miles, more or less.

7. The Donald Dominion Forest Reserve, in the said railway belt, consisting of that part of township 28, range 22, which lies north and east of the Canadian Pacific Railway; that part of township 29, range 23, which lies north of the Canadian Pacific Railway; that part of township 29, range 24, which lies north of the Canadian Pacific Railway; the west half of township 29, range 22; all west of the 5th meridian, and containing 72 square miles, more or less.

8. The Larch Hills Dominion Forest Reserve, in the said railway belt, consisting of that part of township 21, range 8, which lies south of Salmon Arm and west of Mara Lake; that part

of township 21, range 9, south of Salmon Arm, except sections 5 and 6; all west of the 6th meridian, and containing 25 square miles, more or less.

PROVINCE OF MANITOBA.

9. The Riding Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of township 18, range 16; of township 19, ranges 16, 17, 19 and 20; of township 20, ranges 17, 18, 19 and 20; of township 21, ranges 17, 18, 19, 20, 21, 22 and 23; of township 22, ranges 18, 19, 20, 21, 22, 23, 24, 25 and 26; of township 23, ranges 24 and 25; of township 24, ranges 26 and 27; of township 25, ranges 26 and 27; the following sections in township 18, range 17, namely, sections 1, 13, 24, 25, 26, 35, and 36, and the east half of section 12; in township 18, range 19, sections 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36; the north-east quarter of township 18, range 20; in township 20, range 21, sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36; the north half of township 20, range 22; all of township 23, range 26, except section 6; in township 25, range 25, sections 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, and those parts of sections 31, 32 and 33 which may not be included in the Gambler Indian Reserve, probably one and a half square miles; the west half of township 24, range 25; in township 23, range 23, the following sections, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 and 30; in township 23, range 22, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24; in township 23, range 21, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, and the south half of 22; all of that portion of township 23, range 20, lying south and east of the Vermilion River, excepting sections 36 and that part of section 35 lying east of the said river; in township 23, range 19, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30; in township 23, range 18, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 29 and 30; in township 22, range 17, sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, and the west half of sections 1, 12 and 13; in township 21, range 16, sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33, and the south half and north-west quarter of section 14; all of township 20, range 16, except the north-east quarter of section 36; all of township 19, range 18, except the south-west quarter and the west half of the south-east quarter of section 3, and the east half of the south-east quarter of section 4: all of the above being west of the first

principal meridian, and containing in all 1,535 square miles, more or less.

10. The Turtle Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of all of township 1 in ranges 20 and 21, and sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 28, 29, 30 and 31, and the west half of section 27, township 1, range 19, and sections 1, 2, 11, 12, 13, 14, 24, 25, 36, and the east half of section 23 and the south-east quarter of section 26 in township 1, range 22: all west of the first principal meridian and containing  $109\frac{1}{4}$  square miles, more or less.

11. The Lake Manitoba West Dominion Forest Reserve, in the province of Manitoba, consisting of township 21 ranges 11, 12 and 13; township 22, ranges 12 and 13; township 23, range 13; and that part of township 23, range 12, not included in the Ebb and Flow Indian Reserve No. 52: all lying west of the first principal meridian and containing 248 square miles, more or less.

12. The Spruce Woods Dominion Forest Reserve, in the province of Manitoba, consisting of all of township 9, range 15; sections 1, 2, 3, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35 and 36, in township 9, range 16; sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20 and 21, in township 10, range 15; sections 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29 and 30, in township 10, range 16; sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, in township 8, range 15; all lying west of the first principal meridian and containing 110 square miles, more or less.

13. The Duck Mountain Dominion Forest Reserve, in the province of Manitoba, consisting of township 27, ranges 24, 25 and 26; township 28, ranges 24, 25 and 26; township 29, range 23, except the easterly tier of sections, and ranges 24, 25, 26, 27; township 30, range 23, except the easterly tier of sections, and ranges 24, 25, 26, 27; township 31, ranges 23, 24, 25, 26, 27; township 32, ranges 24, 25, 26, 27; township 33, ranges 24, 25, 26, 27; township 34, ranges 24, 25, 26; township 35, range 24; sections 19, 20, 29, 30, 31 and 32 of township 26, range 24; north half of township 26, ranges 25 and 26; east half of township 35, range 25; west half of township 33, range 23; west half of township 28, range 23; all west of the 1st principal meridian and containing 1,251 square miles, more or less.

14. The Porcupine Dominion Forest Reserve No. 1, in the province of Manitoba, consisting of townships 41 and 42, range 27; townships 40, 41 and 42, range 28; the northerly four tiers of sections in township 39; and townships 40, 41 and 42, range

29; all west of the 1st principal meridian, and containing 322 square miles, more or less.

PROVINCE OF SASKATCHEWAN.

15. The Beaver Hills Dominion Forest Reserve, in the province of Saskatchewan, consisting of township 26, ranges 9 and 10, west of the second principal meridian, containing 72 square miles, more or less.

16. The Pines Dominion Forest Reserve, in the province of Saskatchewan, consisting of all of township 47, range 2; all of township 46, range 2, except sections 5 and 6; sections 25, 26, 35 and 36, in township 45, range 2; sections 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, and 33, in township 45, range 1; sections 5, 6, 7, 8, 9, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33, and 34, in township 46, range 1; sections 5, 6, 7, 8, 9, 17, 18, 19, 20, 21, 27, 28, 29, 30, 31, 32 and 33, in township 47, range 1; sections 1, 2, 3, 4, 10, 11, 12, 13, 14, 15, and those parts of sections 5, 8, 9 and 16, lying east of the north branch of the Saskatchewan river, in township 48, range 2: all lying west of the 3rd principal meridian and containing 145 square miles, more or less.

17. The Moose Mountain Dominion Forest Reserve, in the province of Saskatchewan, consisting of all of township 10, range 4; all of township 10, range 3, not included in the White Bear Indian Reserve No. 70; sections 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 28, 29, 30, 31, and those parts of sections 7, 8, 9, 10, 11 not included in the White Bear Indian Reserve No. 70 in township 10, range 2; sections 1, 2, 3, 4, 5, 6, 9, 10, 11, the south half of section 7 and the south half and north-east quarter of section 8, in township 11, range 3; sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and the west half of section 12 in township 11, range 4; sections 1, 2, 11, 12, in township 11, range 5; sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 35 and 36, and those parts of sections 4, 9, 16 and 21 which were not included in the old Indian Reserves Pheasant's Rump No. 68 and the Ocean Man No. 69, in township 10, range 5; sections 24, 25, 26, 34, 35, 36; the north half and south-east quarter of section 23; the north half and south-east quarter of section 27, and that part of the north-east quarter of section 28 and of the east half of section 33, which were not included in the old Ocean Man Indian Reserve No. 69, in township 9, range 5; sections 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, in township 9, range 4; sections 19, 20, 21, 28, 29, 30, 31, 32, 33, and those parts of sections 22, 27 and 34, not included in the White Bear Indian Reserve No. 70 in township 9, range 3: all west of the 2nd principal meridian and containing 163 square miles, more or less.



18. The Porcupine Dominion Forest Reserve No. 2, in the province of Saskatchewan, consisting of townships 39, 40, 41 and 42, range 30; townships 39, 40, 41 and 42, ranges 31 and 32; all west of the first principal meridian, and containing 360 square miles, more or less.

PROVINCE OF ALBERTA.

19. The Cooking Lake Dominion Forest Reserve, in the province of Alberta, consisting of township 52, range 19, west half; township 52, range 20; township 53, range 20; township 54, range 19, sections 18, 19, 30 and 31; township 54, range 20, sections 2, 3, 4, 5, 9, 10, 11, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35 and 36; township 51, range 21, section 7; all lying west of the fourth principal meridian, and containing 114 square miles, more or less.

20. The Cypress Hills Dominion Forest Reserve, in the province of Alberta, consisting of the south half of township 8, range 3, west of the fourth principal meridian.

21. The Kootenay Lakes Dominion Forest Reserve, in the province of Alberta, consisting of the west half of township 1, and the south-west quarter of township 2, range 29, west of the fourth meridian; the east half of township 1, and the south-east quarter of township 2, range 30, west of the fourth meridian, containing 34,560 acres, more or less.

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A brief reference was made last month to the Act to encourage the planting of forest and fruit trees in the State of Iowa. The Bill provides that on any tract of land in the state the owner or owners may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one nor more than five acres in area, or both, and that upon compliance with the provisions of the Act the forest reservation shall be assessed on a taxable valuation of one dollar per acre, and the fruit tree reservation on a taxable valuation of one dollar per acre for eight years. In all other cases where trees are planted upon any tract of land, without regard to area for forest, fruit, shade or ornamental purposes, or for wind-breaks, the assessor shall *not* increase the valuation of such property because of such improvement.

## FOREST LAND TAXATION.

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To anyone who has anything to do with "Woodland Taxation," the very able and carefully worked up article on that subject in the October number of this journal could not fail to interest and instruct.

In this connection it is interesting to note that up to the present day even such taxation is on an agricultural basis in many of the most civilized parts of the world, and not in such proportion as is suggested by Dr. Judson Clark. The countries in which this is the case are notably Germany, Austria and Great Britain. Of the others I cannot speak from experience, but I believe it is true of France as well. In Great Britain this is one of the obstacles in the way of promoting rational forestry in the place of beautiful but profitless arboriculture. The mitigating feature of the rate, however, is that it was made in the seventeenth century when land values were low in Europe so that today it is not very much felt. Saxony, of all countries, the most unexpected, with its modern forestry organization and fully developed manufacturing industries, still continues on this basis, but happily the rate was fixed in 1636. This, of course, only refers to private lands and estates.

The state forest, on the other hand, is treated quite differently, the timber being sold either standing or after being cut down, and no areas are leased for a term of years, so that no rent is payable. In Austria, Hungary and Roumania, such leases occur, but no rental is payable, only royalties on the quantity of timber cut. The same principle has been applied in India, where a royalty on each different size and quantity allowed to be felled is paid. Here in West Africa, even when areas are leased for five or seven years, the same rule applies. Some years ago, before a forestry department was started, before any foresters were in the country, a rental of \$15 per mile was payable, besides \$2.50 per tree to the chief on whose land the trees were felled and a Government royalty of the same amount. As soon as a Forestry Department was formed, in 1902, with a forester, Mr. A. N. Thompson, of Indian experience, at its head, the law was altered and stands at present as follows:—

A commuted royalty on each tree of about 12 feet girth, varying from \$5 to \$15 according to the variety, is paid. Mahogany and cedar being the most valuable, are liable to the highest royalty, whereas ebony, walnut (no relation of *Juglans nigra*, Canadian or American black walnut) and the common woods of the country pay the least. No rental is payable, but the chiefs

owning the land, get \$2.50 for each tree felled. These regulations vary from year to year, according to the place where cutting is being done. The same system is also followed in Siam.

As an incentive to replanting "cut over" areas in some parts of the Black Forest, not only are plants supplied free of charge or money premiums given for planting, but also remission of all land taxation is granted for twenty years, for the land planted, which means that it is tax free, until it yields a small return again, which it does by that time in the locality referred to.

At the present time a method of getting forest preservation practised, and with it a certain amount of forestry, would be to remit all taxation of land under forest or woodland on farms for ten years and then after that tax it on the 17-100 basis.

Those people who notoriously made no attempt at preserving any woodland on their farms might be made to pay double the prevailing rate. If such a law were handled in a liberal spirit, and not too harshly, much might be done to promote rational woodcraft on the farm. Half the fees made by taxing the non-forestry-inclined-farmers might be given to those who undertook extensive planting operations in the older settled portions of the country. This refers primarily to the Province of Ontario. The land office might co-operate with the Forestry Department in gathering this information as to the planting done each year.

It is to be hoped that others will continue the discussion of this subject of Forest Taxation so that some practical action may be taken as an answer to this most important question bearing on the forestry problem in Canada. Upon it turns largely the future of the forest, and for that reason its importance cannot be overrated.

A. HAROLD UNWIN,

*Assistant Conservator of Forests.*

Benin City, W. Africa, April 19th, 1906.

## EXTRACT FROM REPORT OF THE ROYAL COMMISSION ON THE UNIVERSITY OF TORONTO.

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### INSTRUCTION IN FORESTRY.

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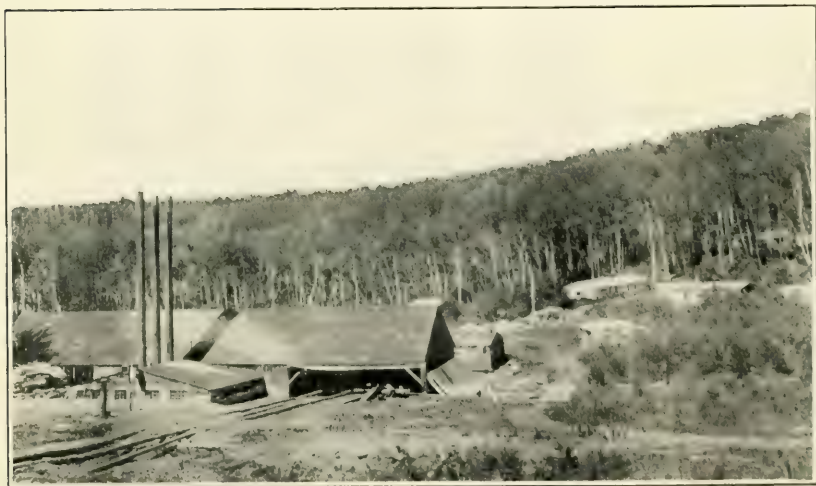
"The distinctively State character of the University entails upon it obligations in respect of all the great provincial interests in which higher education is an important factor. This is eminently true of instruction in forestry. The value to the country of scientific work in forestry has been already recognized upon this continent, but in Canada little has been done to apply systematically the lessons taught equally by sound economic theory and practical experience. It is surprising that Ontario, with its rich areas of timber, has hitherto failed to set up a school of forestry in its own University for the double purpose of providing technical training for young men in an important branch of science, and of benefiting in the conservation of its forest wealth by their knowledge and skill. It would be difficult to mention a case in which the State's duty and interest go more completely hand in hand. In the United States forestry is now an department of the Federal Government's service and is presided over by the Hon. Gifford Pinchot, with whom the Commission has held a conference. Dr. Pinchot has practically created the Forestry course in Yale University, and from that fact and from the knowledge required by his official position in Washington, he is a competent authority upon the whole question. The Commission also consulted, during its visit to Ithaca, Prof. Fernow, who was the founder of the School of Forestry maintained for a time by Cornell University, and who is justly esteemed for his knowledge of forestry."

"There is no doubt that a great work in forestry can be done in this Province by the University, provided it receives the co-operation and encouragement of the Government. The Agricultural College has already provided for instruction in agricultural forestry, which meets the needs of farmers with wood lots to care for and develop. The larger problem is that which touches the immense Crown domain urgently calling for the application there of the newest discoveries in forestry and for the training of skilled men to conduct experiments on a large scale in order to test methods of reforestation and the conservation of valuable timber. It would, in our judgment, be a lamentable error if the direct value of a Forestry Department in the University to the Province in its administration of timber areas were not ascertained."





Log Road in the Riding Mountain Forest and Game Reserve,  
near Dauphin, Man.



Saw Mill in the Riding Mountain Forest and Game Reserve,  
near Dauphin, Man.



“According to the best sources of information to which we have had access, a single chair of Forestry in the University would effect little. One professor could give theoretical instruction, but he could not produce foresters capable of practising their profession. For this field-work is essential. This requires a staff, not of necessity a large one, but adequate to the scope of the work to be done. The Cornell School of Forestry, discontinued owing to a dispute with the State of New York, was a complete University faculty. The Yale School is also a faculty with three full professorships, those of Botany, Civil Engineering and Lumbering, with many instructors who lecture on different kinds of work in the woods. The laboratory equipment cost about \$20,000. At Yale the students must be graduates in Arts. We realize that a beginning may be made without incurring at first all the expenditures of a complete faculty. The University courses in Botany, Chemistry and Engineering could be utilized for the instruction required in these branches and this could be supplemented by a forestry staff of three possessing the special knowledge demanded to carry on both inside and field work. The possession by the Crown of timber lands where practical instruction and experiments could be carried on simplifies the situation, and we recommend that the closest co-operation compatible with the end sought should exist between the University authorities and the Department of Lands. It should likewise be kept in view that the private owners of timber lands have a direct interest in the supply of trained men produced by such a school, and in the results of the experiments made. In the United States the National Lumbermen's Association is subscribing a fund of \$150,000 to endow courses of instruction at Yale. Similar action in Canada should be encouraged. We are strongly of the view that the people of Ontario will endorse the action of the Government in creating a School of Forestry, by means of which the scientific treatment of our forests can be effectively carried out.”

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## REVIEWS.

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*The Determination of Timber Values, by Edward A. Braniff.  
Reprinted from U. S. Department of Agriculture Yearbook  
for 1904.*

This little pamphlet will be of inestimable service to all lumbermen in estimating the value of growing timber, as by means of the tables furnished by Mr. Braniff little difficulty will be experienced in determining what trees can be cut most profitably. Until recently there was scant data upon which to base such estimates, but Mr. Braniff's experiments were made with such care that his estimates may be depended upon to be as nearly correct as they could be made. They were made, not with single logs, but with whole trees, and the total number from which the output was traced was considerable. The logs composing each tree were sawn one after the other and the lumber graded and tallied as it came from the saws. It was found that there was a very considerable difference in the value per thousand feet of lumber taken from large and small trees. For example, yellow birch thirteen inches in diameter at the stump averages \$9.32 per 1,000 feet for all the wood used, while from trees thirty-one inches in diameter the average was \$17.75, a difference of \$8.43 per 1,000 feet, accounted for partly by the presence in the high diameters of the high-priced grade "firsts and seconds red." Sugar Maple was found to increase in value from \$9.75 for a 13-inch tree to \$13.58 for a 28-inch tree, and beech from \$8.29 for a 13-inch tree to \$9.68 for those of twenty-four inches. The practical value of these experiments lies chiefly in the fact that they make clear the unprofitableness of cutting small trees, and except when the land must be cleared it is plain that lumbermen are working directly against their own interests when they permit indiscriminate cutting.

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*Summary Report of the Geological Survey of Canada for 1905.*

The explorers and geologists sent out by the Geological Survey have exceptional opportunities for noting the distribution of trees and the extent and probable value of forests in little known regions, but the report just issued contains fewer notes of this kind than usual as few of the members of the Geological Survey worked last season in districts in which there are valuable forests.



Mr. R. A. McConnell spent part of the season of 1905 in the basin of the White River, one of the principal western tributaries of the Yukon. He found a sparse forest, the chief trees being black and white spruce, aspen, balsam poplar and birch. As a rule the forest is sparse and ceases at about 4,000 altitude. A short time was also spent on Windy Arm, Tagish Lake. The forest is scanty, but there is a supply of rough lumber within easy distance of the mining camps suitable for ordinary mining purposes.

Between Lake Winnipeg and Hudson Bay, Mr. W. Stewart Dobbs travelled by the usual route from Norway House to God's Lake and then examined the country along the Shamattawa and Pekano Rivers. He found almost everywhere that the forest had been burnt over within the last ten years, and many fires were noted in 1905. Mr. Dobbs reports that these frequent burnings are almost always due to the carelessness of Indians. Several unextinguished camp fires were put out by members of his party. He recommends the establishment of a Forestry Department for the region and believes that with a little training the Indians would make good forest rangers.

Mr. W. McInnes worked in the vicinity of Trout Lake, Keewatin, and about the headquarters of the Attawapiskat and Winisk Rivers. The timber over most of the area explored was found to be of small size, though along the banks of the Winisk River and south of that river, there are considerable areas of spruce, poplar and white birch reaching diameters at the stump of from one foot to fifteen inches.

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*The Geological Survey of Canada, Annual Report Vol. XIV.*  
A. P. Low, Director.

Volume XIV of the Geological Survey, the publication of which has been so long delayed owing to structural alterations in the Printing Bureau, has at last made its appearance and, in all respects but one, is of essentially the same character as in former years. That is to say, it contains several reports that have been published many months ago and which, for no reason whatever, are bound together to make a volume. We do not believe that the Sudbury man who wishes to read Dr. Barlow's bulletin on nickel is at all keen on saddling himself with Dr. Adam's views on the wells in the Island of Montreal. And it seems exceedingly improbable that, say a Montreal Brewery Company, interested in deep boring in Hochelaga county, feels it necessary to peruse Mr. McConnell's views on the Nasina series in the Klondike district. This volume, however, is, we understand, the last but

two of the series, the new Director having decided that Vol. XVI will be the last of the series.

The feature that differentiates Vol. XIV from its predecessors is, undoubtedly, the Index. For the first time since these volumes have been published, has a really adequate index been issued with the work and any one who has need to consult scientific books knows what a void a reliable and complete Analytical Index can fill.

The compiler of the Index to Vol. XIV is Editor to the Geological Survey and has now in preparation an Index of the Survey's publications since 1885. We have been permitted to inspect the manuscript of this general Index and can assure our readers that it is compiled with an amount of care and conscientiousness very rare in Government contract work. No trouble has been spared to make the work a reliable reference to the resources of the Dominion as expounded by the Survey officers, and though forestry has not received any more attention than any other branch of the work, it was naturally to forestry that we turned.

Every tree, plant or flower in Canada is assigned to the district or districts in which it is found, so that one has only to look up each particular tree in the Index to know exactly in what locality it flourishes. It has occurred to us that it would be of great service to our readers if we were to print, from time to time, extracts from this work, showing the exact distribution of the common trees in Canada. A very great many references, for example, are assigned to "Spruce"—too many, by far, for us to print in this issue, but the list is divided into the various kinds of spruce, from which we cull, as an illustration, the white variety. It must, however, be mentioned that the work is not yet completed and that the subjoined list does not, therefore, purport to include every district in which white spruce is found.

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Mr. E. G. Craig, Inspector of Forest Reserves, has just returned to Ottawa from the west for a short time.

The Forestry Branch is this year making a detailed survey of the Riding Mountain Forest Reserve with a view to determining the amount of timber on the reserve, the rate of growth of the various species, and general silvicultural and economic conditions. The Riding Mountain is still quite well forested with white and black poplar, spruce, larch, birch and some jack pine, Manitoba maple, ash, elm, and oak. Fires have done a great deal of damage in the past and of late years. Galician and halfbreed squatters have encroached upon the forest and set many destructive fires in order to remove the timber which they think is the cause of the land being withheld from homestead entry. The land is not suitable for profitable agriculture, but is excellent for forestry purposes.

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The Macdonald Institute, through the Ontario Agricultural College, is affiliated with Toronto University, and the work of the above classes will be recognized *pro tanto* in the courses leading to the University degree in Household Science.

**G. C. CREELMAN, President.**

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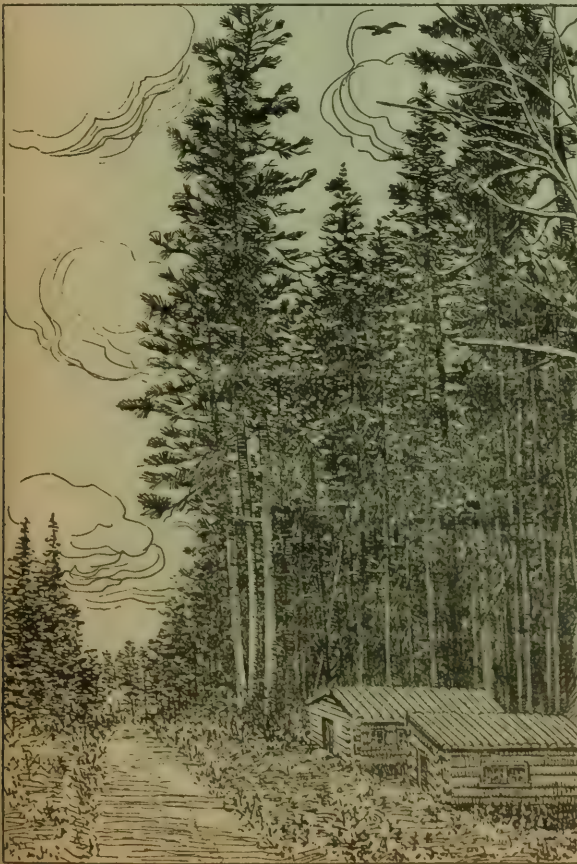
THE management of the forest is identical with the management of the school. The teachings of the school are put into practice in the forest. The course at the school comprises 12 consecutive months of theoretical as well as practical instruction. Object lessons on a large scale are offered in the woods.

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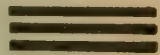
**C. A. SCHENCK, PH. D.,**  
**DIRECTOR.**



# CANADIAN FORESTRY JOURNAL.



DECEMBER  
1906



PUBLISHED AT OTTAWA  
BY THE  
CANADIAN FORESTRY  
ASSOCIATION.



# Canadian Forestry Association.

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## **THE objects of THE CANADIAN FORESTRY ASSOCIATION are:**

The preservation of the forests for their influence on climate, fertility and water supply; the exploration of the public domain and the reservation for timber production of lands unsuited for agriculture; the promotion of judicious methods in dealing with forests and woodlands; re-forestation where advisable; tree planting on the plains and on streets and highways; the collection and dissemination of information bearing on the forestry problem in general.

This Association is engaged in a work of national importance in which every citizen of the Dominion has a direct interest. If you are not a member of the Association your membership is earnestly solicited.

The annual fee is \$1.00, and the Life Membership fee \$10.00.

Applications for membership should be addressed to the Secretary,

**R. H. CAMPBELL.**

OTTAWA, ONT.

Department of the Interior.







Forestry Association Convention Trip to Mr. Gilley's limit near Vancouver.

# Canadian Forestry Journal.

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VOL. II.

DECEMBER, 1906.

No. 4.

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## CANADIAN FORESTRY CONVENTION.

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VANCOUVER, B.C., 26TH AND 27TH SEPTEMBER, 1906.

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The Canadian Forestry Convention held in Myers' Hall, Vancouver, on the 26th and 27th of September, was successful, both in the large number in attendance and in the enthusiasm and interest which it awakened. No province of greater forest wealth or more magnificent possibilities than British Columbia, no pleasanter or more beautiful place than the City of Vancouver could have been chosen for the holding of the Convention, and no welcome could have been warmer than that given to the delegates by the city and the Lumbermen's Association.

The arrangements made by the local committee were thorough, so that the work of the Convention was carried on smoothly.

The Convention owed much to the kindly interest and support of His Excellency the Governor-General and Lady Grey, and the co-operation of the Provincial authorities was also heartily given.

At the opening of the Convention, Mr. John Hendry, President of the British Columbia Lumber and Shingle Manufacturer's Association, welcomed the delegates, and then called Mr. E. Stewart, President of the Canadian Forestry Association, to the chair, who responded in a few words to the kindly welcome. The President then called upon His Excellency the Governor-General to open the Convention. He was received with cheers and said:

"It is, I consider, a very high privilege, to be allowed to open this forestry convention," he said after his introduction,

"which has assembled on the invitation of Mr. Hendry, representing the Lumbermen and Shingle Manufacturers of British Columbia. This convention has been called together for the purpose of considering what steps shall be taken to discover and to apply to the forests of British Columbia the best methods of forest management. At the beginning of this year, a similar convention was held at Ottawa, under the presidency of the Federal Prime Minister, Sir Wilfrid Laurier, who convened it. I attended all the meetings of the convention, which lasted for three days, and I can bear witness to the fact that from the beginning to the end of that interesting convention, the papers and discussions averaged a singularly high order of merit, and that the interest of those attending the convention never flagged. The reason for this continued and sustained interest was this: We were dealing with a subject which all of us recognised to be of vital importance to the well-being of Canada. (Applause). We realised that the forests of Canada are the reservoirs that feed the rivers, on the even and continuous flow of which the agricultural prosperity of Canada depends. We realised that the reckless and wanton deforestation of other lands had converted territories at one time prosperous and populous, into stretches of barren wilderness, and we also realised as we listened to the papers and discussions, that in her forests Canada possesses an asset of priceless value and that if we can only apply to their management those principles and methods which have been shown to give the best results in other countries, we may look forward to deriving from our forests a continuous and increasing revenue, without destroying our capital. (Applause). The world's demand for timber is steadily increasing, the thoughtless improvidence of other countries having depleted timber resources which were considered almost as inexhaustible as those of British Columbia itself. I cannot commend to you too strongly the importance of studying now, before it is too late, those methods and principles of forest management which the experience and research of other nations may indicate to be the best. At Ottawa we were very greatly assisted by Mr. Pinchot, the head of the Forestry Department of Washington. I had hoped that Mr. Pinchot, whose admirable primer on Forestry ought to be on the bookshelf of everyone who cares about trees, might have been present here to-day. President Roosevelt is a warm friend of Canada, and takes a great deal of pleasure in helping Canadians to promote the welfare of their own country. Mr. Pinchot has kindly sent as his representative, Mr. Price, whom we are fortunate to have among us to-day, and I am sure that I am only voicing your sentiments when I say that you are grateful to the Government of the United States for sending Mr. Price to assist us in the work of this convention." (Applause.)



HON. JAMES DUNSMUIR,

Lieutenant-Governor, who was the next speaker, said:

"Your Excellency, Mr. Chairman, ladies and gentlemen,— It is with the greatest pleasure that I welcome the delegates of the Canadian Forestry Association here to-day, who have assembled from all parts of the Dominion in this city of Vancouver to discuss a subject that is in this Province second to none in any other portion of the continent. (Applause.) Many of you are visiting this coast for the first time, and cannot fail to be impressed with the widespread development that is going on throughout the West in which the lumber industry plays a very prominent part. Graced by the presence of His Excellency, the Governor-General, and surrounded by every evidence of prosperity, you are met in a vigorous city that is springing up as if by magic. Surely there is no better place for the inauguration of your labors. (Applause.) I feel sure that in His Excellency the Governor-General, the Forestry Association will have a friend who knows, from his extensive travels throughout the Dominion, how enormous are the extent and values of our forests, and undoubtedly his influence will be most favorably directed. (Applause.) Allow me to congratulate the Association on the great work it has already accomplished in awakening the public interest in forestry, and let me assure you, gentlemen, that you have my sincere good wishes. I trust that your deliberations will bring forth results that will be beneficial, not only to British Columbia, but to Canada as a whole." (Applause.)

PREMIER MCBRIDE

said it was indeed a great privilege to be invited to be present at the meeting of the Association and to take some part in the opening proceedings. He was interested because it was essentially a business concern. "Your conventions," he said, "are not given to those formalities which are experienced in the West from time to time in public gatherings of this kind. It is more than an ordinary privilege to take part in the opening proceedings, and as a Canadian resident of British Columbia, I am proud to be on the platform side by side with the representative of King Edward VII. The Association, so far as it has been successful in finding the eye of the representative of the King in Canada, is a most fortunate body indeed. I listened with a great deal of interest to the words of the President when he referred in flattering terms to the work of Lord Grey's predecessor, Lord Minto, and he had also listened to His Excellency's words at the meeting in Ottawa not so very long ago, pointing conclusively to the fact that this subject is engaging a great deal of attention in this Dominion of ours. In regard to the meeting place, I feel satisfied

that no quarter of the Dominion could have been taken in preference to Vancouver and in British Columbia.

"It is no vain boast of the Canadians who live in the West to say that the timber wealth of this Province is illimitable, and that there is no place in the known globe where the timber can compare in quantity or in quality with the huge forests of British Columbia. (Applause.) It has been to those who have charge of the business of the country a serious matter when they come to consider just how far reaching their responsibility with regard to the timber industry really is. His Excellency has sounded a note of warning. He has spoken of countries where wanton waste has resulted in deforestation, and he told us that we must be careful in this Province not to repeat the same experience. The warning is well-timed. I find in my intercourse with lumbermen that very great surprise is occasioned among those engaged in the industry in the East at the wasteful practice which prevails here of allowing a great deal of valuable timber to lie and rot in the woods, which, down in the interior and eastern parts of the continent, would be considered a marketable commodity. The first duty of British Columbians is the preservation of the forests, and the economical operation of the lumber industry. (Applause.)

"Up to date British Columbians have been trying to do the very best they can with the resources at command. It must be remembered however, that the superficial area of this Province is much greater than the area of the Province of Ontario, or that of Quebec, or of all the maritime provinces put together. When it is considered that a mere handful of taxpayers has the responsibility of attending to this immense area, I think it must be admitted that the Province has done remarkably well. But the Province is not satisfied with what it has done. (Applause.) The people were quite sensible of the situation which stares them in the face. They know that the tremendous forest fires which rage in the summer and fall mean the destruction of thousands of dollars' worth of valuable timber. We know that away beyond the zone in which Vancouver finds herself, away down in the interior of the Province, the same waste goes on, and we realize that the responsibility rests upon us to deal with the problem as soon as it is possible to do so." (Applause.)

After acknowledging the ready co-operation which the Provincial authorities receive in this direction from the Dominion authorities in the same field, Mr. McBride said it was a matter for great congratulation that such a spirit of co-operation was manifest in the Province between employers and employed in the lumber industry. To-day, he said, the mills of the Province were running, he believed, at their full capacity. They had orders that would keep them so employed for months to come,

and he considered that it was fortunate to find all parties concerned in the operation of these industries meeting on common ground, and standing side by side, and doing so well for themselves and for their country.

The President's Address was given by Mr. E. Stewart. It was an argument for the importance of the forests of British Columbia in particular and of Canada in general, and quoted from European authorities to show that they were feeling the shortage of the wood supply, and were looking to Canada as one of the principal sources to meet the shortage. This address is reproduced elsewhere in this issue.

Mr. Overton W. Price, Associate Forester for the United States, was introduced and gave a splendid outline of the work which is being done by the Forest Service of the United States. The principle on which the service is working was thus described:

"What the service has accomplished and its capacity for further accomplishment is due, in my judgment, more than to anything else, to working always under the principle that the forest is for use—to meeting forest problems not by paper work but by practical study on the ground; and to its trying to get forestry into effect not merely by propaganda, not by a policy of arbitrary interference but by co-operation. This is what has kept us out of the rut of ineffectual officialdom—and it has been said that the only difference between such rut and the grave is the length and the breadth."

A telegram from Hon. Walter Scott, Premier of Saskatchewan was read, in which he expressed the interest of his Government in the Convention and his regret at being unable to attend. A communication was also read from Mr. G. Spring-Rice, who had been appointed to represent the Province, but had been detained.

Hon. F. J. Sweeney, Surveyor General of New Brunswick, speaking for that Province, stated that:

In New Brunswick the principal revenue came from Crown timber lands and that frugal care had to be taken of them. For that reason all through the legislation ran the thread of protection of the forests. The principal enemy was fire. He was of the opinion that education in this matter should start in the schools and that more attention should be given to conservation of forests, for this Canada of ours would be a small place indeed without its timber resources. In New Brunswick game wardens are made fire wardens also to some extent, and road superintendents and all employees of the Provincial Government are instructed to look out for and check forest fires. Scalers also give a patrol system which is effective. He said that forest fires followed the advent of the railway, and when the G.T.R.

was constructed across New Brunswick legislation was passed that each survey party should take extra precautions. He trusted that this convention would be of great assistance in the preservation of our natural inheritance.

#### HIS HONOUR G. H. V. BULYEA, LIEUTENANT-GOVERNOR OF ALBERTA

said the addresses had been profitable to him and he hoped to get more information as to how to preserve the timber resources. In his province, lying east of the mountains, there was a considerable extent of forest, north of the Saskatchewan River, but at present the two Prairie Provinces had to get their lumber from British Columbia. The question of preservation was of vital importance to the people here, for if the price of lumber went higher it meant much to them. He thanked the President for his invitation, and said he came for information. He confessed he had practically no knowledge of the lumber interests, but he appreciated the fact that every protection should be given to the forests.

Hon. W. H. Cushing also represented the Province of Alberta. A Resolution Committee was appointed as follows:

#### RESOLUTION COMMITTEE.

John Hendry, Chairman; F. W. Jones, R. H. Alexander, Hon. F. J. Sweeney, William Pearce, Aubrey White, H. M. Price, J. Hillyard Mitchell, James Leamy, Hon. R. F. Green, R. H. Campbell, Hon. W. H. Cushing, E. H. Heaps, W. H. Rowley, D. C. Cameron, G. D. McKay, G. O. Buchanan.

#### SUB-COMMITTEE, B.C.

F. W. Jones, Chairman; E. H. Heaps, R. H. Alexander, D. C. Cameron, Hon. R. F. Green, G. D. McKay, G. O. Buchanan, Jas. Leamy.

#### AFTERNOON SESSION.

This Session was devoted mainly to the Province of British Columbia. The first paper, entitled "Timber Conditions of British Columbia—with relation to Extent, Revenue and Legislation," was by Hon. R. F. Green, Commissioner of Lands and works, and gave an able statement of the position of British Columbia in regard to forest wealth and the administration of the timber.

Mr. R. H. Alexander of Vancouver, gave a paper on "Lumbering Conditions on the Coast of British Columbia."



Mr. F. W. Jones, President of the Mountain Lumbermen's Association of British Columbia, read a paper on "The Lumbering Industry in the Mountains." After sketching the development of the lumber industry in the mountains, in which the Mountain Association had an important part, and predicting a bright future for it, Mr. Jones went on to say:

"We are all in sympathy with the objects of the Canadian Forestry Association; that we are all members of that Association, that a great many of our members are here to-day, and that all the rest would be here if they could possibly have got away.

"In the mountains, reforestation is not a live issue at present, but our interest is to establish some better system of preserving and managing what the Almighty has given us and stopping the enormous destruction of standing timber by fire. We want better laws for dealing with fires; some attempt at a 'Fire Ranging System,' in the interior of B. C. by the Provincial Government; more definite regulations covering the difference between agricultural and timber lands; a campaign of education under the auspices of the Forestry Association, as to the importance of preserving standing timber (even small growing trees which will not be fit to log for some years), putting down fires, and keeping squatters out of timbered areas and places where young timber is coming on; and an amendment of the Provincial regulations providing for such tenure and terms on timber licences, that the lumbermen will be able to pay some attention to Forestry principles, in carrying on their operations.

"Next to fire, the greatest enemy to the proper management of the Forest resources of this Province, is the manner in which they are administered, particularly in the way of the title given to timber licences, and the rentals charged.

"The present regulations would seem to have been invented for the purpose of forcing the clearing of each limit as rapidly as possible, in order that it may be abandoned at the earliest date.

"Practically all the timber land in the interior, outside of the Dominion Belt and lands given to railways, is held under special licence. Each special licence consists of not more than 640 acres and for this an annual rental of \$1.15 is charged, in addition to the dues of 50 cents per thousand, when the timber is cut.

"In neither case is there any provision whatever for renewal after the expiration of the 16 or 21 years period, as the case may be.

"Now the natural result of the very high rental, the uncertainty of tenure, and the possibility of a sharp increase in the rental of the 21 year licences at any time the Government needed

money, is that the timber must be cut as quickly as possible. No operator can afford to hold it to give the thrifty young timber a chance to come to maturity, and, therefore, the timber marketable at the present time is cut off, the limit is thrown up, and sooner or later the fire gets the timber that has been left standing, which under conservative management, would have been more valuable to the holder and to the Government, than that which has been logged.

In the first place there should be a regulation that these licences will be renewable from year to year so long as merchantable timber remains thereon, coupled if necessary, with a regulation requiring holders of more than a limited number of licences to manufacture a certain proportion.

"Then there should be some kind of a graduated scale of rentals. I do not suggest an immediate reduction of the rental, because the Government of the Province must have money—they want it for fire ranging, if for nothing else—but suppose for the first five years, a rental of \$125 per square mile were collected, for the next five years, if the holder had erected a mill, and was manufacturing a reasonable amount of lumber, and was holding these licences to give a permanence to his operations, let the rental be fixed at \$50 per annum; for the third five years, reduce the rental to \$25, and continue that rate thereafter, so long as timber remains and a sawmill is operated. By this scale each mile of timber would produce \$1,000 for the Government in rentals during the first fifteen years, and a revenue of \$25 per annum after that period.

"Lumbermen in the interior, who now contribute much the larger half of the special licence fees of the Province, under some such plan as here outlined, would add to their holdings, the Government would get a greater revenue for the next few years, more timber would be taken up, and once taken up, there would be the owners in addition to the fire rangers we hope to have appointed, to assist in protecting it against fire; a greater permanence would be given to lumbering operations, and better than all else, from a forestry point of view, the millmen or loggers would be able to so plan and carry out their cutting as to conserve the forest resources of the country—young growing timber would become a valuable asset to the country instead of being neglected and allowed to be destroyed.

"This suggestion is recommended to the attention of this Convention, and if, after discussion, the principle of it is approved, as I hope it will be, no doubt the Government will strongly recommend it to the attention of the Provincial Government.

"Personally, I look for many good results to the forestry interests of this Province from this Convention. The discussions

which are taking place, and the publicity which will no doubt be given them by the press, will help along the cause. And if we can at last get the Government of the Province to awaken to the importance of our forest resources (except when collecting fees and taxes) we may all feel as though we had made two blades of grass, where only one grew before."

Mr. Jones then dealt at considerable length with the Fire question and submitted a draft resolution on the subject.

Mr. Aubrey White, Deputy Minister of Lands and Forests for Ontario, stated that:

"In the appointment of fire rangers in Ontario they had been careful to eliminate the chances of political profit. They wanted the men who understood the conditions best, and for this reason he proposed to leave the appointment of the fire wardens to the lumbermen, the Government to pay half and the lumbermen to pay their half. After starting in this manner with 10 fire wardens the number had grown to between 700 and 800 scattered throughout the province, and this year they would spend \$90,000 in fire protection and the lumbermen would spend between \$70,000 and \$80,000. There was some danger of fires starting in Ontario, and when the railway was built to Parry Sound they made an arrangement with Mr. Booth to appoint fire wardens, and it worked so well that they did not have a single fire.

"They had now put upon their statute books a law that when a railway company was constructing a line of railway through a timbered country, they could appoint as many guardians as they pleased, the Government paying half and the railway company paying half, and the cost of extinction of fires was met in the same way.

"There was of course, a trouble between settlers and lumbermen as to the location of land, so that when a man applied for land they sent an inspector and on his report they gave or withheld the grant. He agreed with President Roosevelt that for the settler who wanted to make a home on the land he had the greatest respect, but for those who wished to denude it of its timber and then leave it they would make it as hard as possible, and this was a policy he would recommend to the people of British Columbia."

Mr. W. H. Rowley, Manager of the E. B. Eddy Coy., of Hull, P.Q., spoke strongly in favor of educating the children in schools to properly value a tree. The question of the preservation of the forest wealth for the people of Canada, was, he considered, a matter that this convention should take up, and in connection therewith moved the following resolution:—

"Since an Omnipotent Providence has placed within the confines of the Dominion of Canada, the most of the best green trees on earth, and has thus given to Canadians an heritage above ground, that is easier of access and is worth all the mines and minerals stored in the bowels of our earth, and all the fishes with which our lakes and seas are swarming, therefore

*Be it Resolved*, That the Federal Government be again urged to prohibit the exportation from Canada, of saw logs, blocks and pulp wood, in order that the full benefit of the conversion and manufacture of this raw material may accrue to the advantage of the Canadian Saw Millers and Pulp and Paper Makers, rather than that our saw logs, blocks, and pulp wood be longer allowed to be exported to the disadvantage of the Canadians, but to the advantage and great profit of our commercial competitors to the south of us."

After discussions by Hon. R. F. Green, Aubrey White, Mr. McKinnon, Duncan Ross, M.P., R. H. Alexander, H. M. Price and D. W. Higgins, the motion was put to a vote and declared lost.

#### EVENING SESSION.

In the evening a banquet was held which was largely in the nature of a reception to His Excellency the Governor General, and was presided over by Mr. John Hendry.

The toast of "The Forest Interests" was responded to by Hon. Wm. Templeman, E. Stewart and Overton W. Price. Hon. Wm. Templeman said that it was a unique occasion since 21 years ago the spot on which they now were was covered with a dense forest growth. Here to-night were present captains of industry, people representative of the great commercial life of Canada. He referred to the time when Ontario was covered with virgin forests, most of which have now disappeared. Some would say that British Columbia was the greatest producer of lumber. This Province had perhaps the largest area of timber of any province, yet the time had come when the rapid depletion should be stopped, and the forests made a permanent source of revenue. He made reference to the great extent of forest wealth which might be converted into pulp. This one feature had impressed him and the great necessity of conserving the forests. This, however, was only a small instance. As a result of the recent convention of the Forestry Association at Ottawa, legislation was passed creating a forest reserve in the two new provinces of the Middle West. This was one great step toward the conserving of the timber resources. He expressed his strong sympathy with the objects of the association.



In a splendid and witty speech His Excellency replied to the toast of his health, dealing with matters of general interest. He spoke particularly of the questions of market and labour which are of pressing importance in British Columbia at the present time.

"The Allied Interests" were proposed by His Honour, Lieutenant Governor Dunsmuir, and responded to by Mr. Flummerfelt, Mr. F. W. Cockshutt, President of the Canadian Manufacturers' Association, Mr. W. K. George and Mr. R. P. McLennan, President of the Vancouver Board of Trade.

Mr. Campbell Sweeney proposed "The Press" which was responded to by Hon. F. L. Carter-Cotton and Mr. L. D. Taylor.

#### THURSDAY, 27TH SEPTEMBER.—MORNING SESSION.

The first paper, presented by Dr. Judson F. Clark, Forester for the Province of Ontario, was entitled, "Forest Revenues and Forest Conservation" and was an argument for a change of policy in disposing of timber. He said:

"Present lumbering methods are devastating the Canadian forest. Why is this? Lumbering is the business of removing the mature timber, and this should improve the forest. It has done so elsewhere for centuries. Not in Europe and Asia alone, but in many places in North America. Why does it not do so on the Canadian timber limits? There are, indeed, isolated examples of improvement by lumbering even here which show the possibilities, but the exceptions to the rule but emphasize the failure of the present policy as a whole.

"It is my belief that the fatal weakness of the present system of disposing of Provincial timber is to be found in the fact that the provisions of the agreements entered into by the provinces as sellers and the lumbermen as purchasers place a minimum on destructive lumbering. In other words, the terms of sale which have found general acceptance make it to be in the financial interest of the operators to despoil rather than to conserve the forests.

After discussing the methods in practice at present, Dr. Clark outlined the policy he would suggest as follows:—

"Preparatory. A first step in the preparation for a sale of timber should be to make an estimate of the quantities of the different kinds to be sold for publication with the advertisement of the sale. An estimate of the value would also be made, this latter for the use of the Forest Department in determining their reserve bid.

**Advertisement.** The advertisement in the case of large sales should be published at least a year in advance of the auction, that ample opportunity may be given for completing business arrangements looking to purchase, and for the exploration of the tract by prospective purchasers.

The advertisement should state the location and area of the tracts offered, the approximate stand of the different kinds of timber, and the time and place of auction. Intending purchasers should be invited to apply for information regarding the rules and regulations governing the cutting and removal of the timber, the manner of payment and other details.

**Cutting Regulations.** The cutting regulations should be prepared with special reference to the individual tracts offered for sale, and would be governed by local conditions.

In general they would include:

The designation of the timber to be cut, and, conversely, specifically prohibit the cutting of timber not offered for sale—for example, immature timber under a set diameter limit.

Provision for care in the felling and in the removal of the timber.

Provision for the prevention of waste by limiting the height of stump, by prescribing the use of the saw where practicable, and by providing for the utilisation of inferior materials.

Provision regarding the disposal of the debris—such as logging tops, burning brush, etc.

The time limit for the final removal of all timber sold.

Specifications as to measurement of timber logged.

Adequate penalties for violation of cutting regulations, as for example payment at double the regular purchase price for any merchantable timber left in the woods by the loggers.

Time and manner of payment.

Provision for a bond to insure the faithful performance of the contract by the purchaser.

**Method of Sale.**—By public auction, bids being asked on the amount to be paid per thousand feet when the timber is cut.

**Ground Rent.**—To prevent speculative purchase by others than bona fide operators a fairly high ground rent per mile might with advantage be provided for. The payment on account of ground rent for any particular year might be made to apply on the stumpage dues account for the same year. This would throw the whole weight of the ground rent taxation on the purchaser who failed to operate, and would at the same time provide automatically for release from taxation, immediately that he actively undertook to carry out his obligations.

**Unit of Area.**—The square mile forms a desirable sale unit. This would give lumbermen of limited capital and jobbers an opportunity to do business on the public forest lands, and if the

number of miles which any one concern may purchase be unlimited no injustice will be done the largest operators."

"Forest Reserves" was the title of a paper by Roland D. Craig, Inspector of Dominion Forest Reserves, who said :

"For several years the Dominion Government has withheld portions of its timber land from settlement, but it was not until the passing of the Forest Reserves Act last Session, that they were definitely and permanently set aside for forest purposes. These Dominion forest and game reserves are situated in Manitoba, Saskatchewan, Alberta and in the Railway Belt in British Columbia, and cover in all about five and a half million acres.

The objects in setting aside these reserves are to protect and improve the forests for the purpose of maintaining a permanent supply of timber, to maintain conditions favorable to a continuous water supply, to protect the animals, fish and birds within the reserves, and to ameliorate the climate.

The lands so reserved are withdrawn from sale, settlement, occupancy or other trespass, which may interfere with the objects of the reserves.

It is not, however, the purpose to prevent the use of timber which is produced, but its exploitation shall be under the direction of the Superintendent of Forestry, and conducted in such a way that the perpetuation of the forest shall be assured.

The reservation of the land for forest purposes, does not in any way interfere with the development of mines within their boundaries, but on the contrary, the supply of timber being produced in the vicinity will greatly facilitate mining operations.

The value of maintaining forests at the headquarters of streams used for irrigation and water power is most important, and this is the chief object of those reserves which have already been set aside in British Columbia.

It is absolutely necessary, if the country in the interior of British Columbia and on the east slope of the Rocky Mountains, is to develop along agricultural lines, that a forest cover may be maintained on the watersheds to protect and regulate the streams which will bring wealth and prosperity to an otherwise unproductive waste. If the forests are removed it will cost millions of dollars to build dams and reservoirs to control the spring freshets and conserve the water for the use of the crops, and in the end they will not be so effective as a good forest cover.

Not least among the objects of these reserves is the preservation of game in the forests and the fish in the waters within the reserves. By maintaining the forests about the headwaters of the streams, the spawning beds of the salmon and other fish will be protected. It is lamentable to see the rapidity with which

our magnificent game-animals, such as the moose, elk, and caribou are being destroyed, and we hope to be able to afford them such protection in these forests and game reserves that they shall not have a similar fate to that of the buffalo."

Mr. R. S. Cook of Prince Albert, speaking as one charged with the care of the vast timber interests of Saskatchewan, had a word to say. In his province they had immense tracts of timber north of the Saskatchewan River, and when travelling over these he was struck by the enormous waste from fires. They cut about 50,000,000 feet at one mill in Prince Albert annually, but this amount was a trifle compared to that wasted by fire. He thought it would be a good thing if the services of the Northwest Mounted Police were enlisted in fighting fire, because the Indians stood in awe of a Mounted Policeman. In the northern part of Saskatchewan he had seen more timber destroyed by fire in a year than would supply the whole southern part of the province and Alberta with the lumber they needed.

Hon. F. J. Sweeney, Surveyor-General for the Province of New Brunswick, said that they provided for reforestation on Government reserves in his province by allowing the lumbermen to cut no trees less than ten inches in diameter three feet above the ground. They provided against fires by appointing fire rangers and assigning to them districts which they were supposed to visit at certain periods. In addition to this they also prohibited hunters from going into the woods during the close seasons which corresponded with the warm weather. They had also framed laws in connection with the public domain to prevent settlers or squatters going on land that was useful for timber but unfit for purposes of settlement. When a settler made application for land, they had it examined by an inspector, who reported upon it before it was allotted.

Mr. Lindmark (Revelstoke) called attention to the necessity of doing something for the prevention of fires. A great danger lay in the cuttings left on the ground. In his camp they had taken to gathering the cuttings together in the fall and after placing a guard round them had burnt them. This served two purposes. First, it lessened the danger of fire, and secondly, it cleared the ground for the growth of young plants. The convention should prove a stimulus to the adoption of better methods of forestry. As an instance of one improvement it had brought about, he mentioned that last year they had asked that all log-scalers should be made Deputy Fire Wardens. The Government had adopted the suggestion and he gave instances to show that it had been of great service in checking fires. He also hoped in time that they would have a School of Forestry in B.C., as they had in his native country, Sweden, where it had been of



inestimable service in training the young to appreciate and preserve their forest wealth.

Mr. White (Pembroke) said he questioned whether the suggestion that the debris should be burned would be of any value in the East. Burning in the fall would simply destroy the moss and lichen, which might check the fires and would still leave the trees to burn.

Mr. Overton Price said that

#### IN THE UNITED STATES

fire protection was still in the experimental stage. They would be willing to give up everything else to be assured of absolute protection from fire. In the Eastern States they had tried the practice of gathering together the tops of trees and burning them, but it proved quite costly and on the Pacific Coast where the forests were large would be quite impracticable. He did not know that even in the Middle West and on the Atlantic Coast the burning of tops was a success, because they were still liable to fire, the only difference being that they would have a flash fire from burning the trees and there would be less heat than if the underwood had been left. It was a question to him whether the money would not be more wisely expended in appointing more firemen.

Mr. Craig: "How about forest sales in the United States?"

Mr. Price said timber lands were advertised and sold by tender for five years. To make sure that the young trees would be preserved and only the mature timber taken away they marked the trees that were allowed to be cut.

Hon. Mr. Sweeney: "That is only a sort of pruning of the forest."

Mr. Price: "No hardly that. I am afraid we allow too much of the timber to be taken off as it is.

Mr. White (Pembroke): "Old style lumbering, I suppose." (Laughter).

Mr. Knechtel, Forester of the State of New York, being called upon supported Dr. Clark's advice about the preservation of forests. He instanced the Black Forest in Germany. At first it was being destroyed by careless lumbering but for the past 200 years reforestation and lumbering had been carried on there together successfully. What the Germans had been doing could be done here.

Mr. Peter Lund (Cranbrook) agreed with Mr. Lindmark that the forest preservation methods adopted in Sweden could not be surpassed, and it would be well for the Association to obtain some of their literature. For a number of years he had

been engaged in railway construction, and consequently in forest destruction, but he had joined the Association about a year ago, and though trees to-day looked more beautiful to him than formerly, he felt the need of better local organization. They could have meetings here and there, and get literature and have discussions on the methods of forestry. Every man, woman and child in British Columbia should be taught the necessity of preserving the forests.

Mr. Overton Price, in answer to a query, explained the methods of giving publicity to forestry information in the United States. They had formerly issued large bulletins, but these were not read, and now instead they issued short circulars which were distributed among 20,000 lumbermen in the United States. In addition to this they had a press bureau which employed a number of newspaper men, who went and obtained information and then put it into palatable shape and they got as much as possible into newspapers and magazines.

Mr. H. B. Gilmour spoke of the necessity of lumbermen starting on their limits at the right place. Whenever a fire started on the bottom of a mountain it always climbed to the top, and if lumbermen would always locate their camps in the highest places there would be much less danger from fire than now.

Mr. W. H. Higgins said he had been much interested in the proceedings and he hoped that the Government would rise to the occasion and help them to preserve what was given them. Regarding the burning of tops and cutting, he found that the growth of young timber for about three years made a hotter fire than what had been cleared away. In regard to making the camps in the highest place as suggested by Mr. Gilmour, it sounded very well in theory, but in practice he would not like to try it. He had himself been a sufferer from fire and knew what it was, and in this respect he related his own experience. He trusted that the deliberations of the convention would result in profit to them all,

The following resolutions were submitted by the Committee on Resolutions and passed:—

WHEREAS the destruction of large areas of the Forest wealth of Canada by fire is still of yearly recurrence be it

RESOLVED, That it is incumbent on the Governments of the Provinces of the Dominion to legislate at the earliest opportunity still more stringently against the use of fire in timbered portions of the various Provinces during the summer months and further and of equal importance, to provide means for efficiently carrying out the provisions of the Statutes that may be passed.

RESOLVED, That the attention of the proper authorities be directed to the necessity of a strict and rigorous enforcement of the law relating to the prevention and control of prairie fires, as such fires, in addition to being particularly destructive in relation to the production of forage, have proved exceedingly disastrous in their effect on the growing timber as well as preventing the extension of those timber areas which, though small, are valuable both for shelter, beauty and future forest supply.

RESOLVED, That this meeting of the Canadian Forestry Association desires to re-affirm the resolution passed at the Canadian Forestry Convention held at Ottawa in January last regarding the reservation of the forests required for the protection of streams furnishing a supply of water for irrigation and for the prevention of destruction by floods, and specially desires that speedy action should be taken in the direction indicated by the resolution referred to and that this matter be brought to the attention of the proper authorities at as early a date as possible.

RESOLVED, That in order that our Forest resources may be so handled as to become as nearly as possible a permanent source of timber supply it is important that regulations governing the leases should provide for a tenure under such conditions as will encourage the adoption of the best Forestry methods in all lumbering operations.

RESOLVED, That this meeting of the Canadian Forestry Association desires to bring to the attention of the proper authorities the desirability of taking steps to promote Forestry through the schools and educational institutions.

RESOLVED, That the Association strongly endorse and recommend to the Provincial Government the request of the British Columbia delegates for action on the following points:—

That a thorough system of fire ranging be established. That under the supervision of one or more chief wardens, the timbered areas of the Province be divided into districts, in each of which two or more salaried rangers be employed during the six summer months, with authority to make arrests for violation of the laws relating to fires, to take immediate action and enforce help to put out such fires as may occur, also to issue or refuse permits to set out fires during the dry season, and to supervise such fires where necessary, on account of the possibility of danger.

That the following suggestions made by the Associated Boards of Trade in Convention at Cranbrook on the 1st of February, be endorsed and again recommended to the authorities.

1st. That the Provincial Government secure for the place of Chief Fire Warden, a man of zeal and enthusiasm, who being

retained in the service for a term of years, would evolve a system of protection suited to the special circumstances of the country.

2nd. That the provision be made, whereby land owners and holders of timber leases, and licences, pay a part of the expenses incurred in the prevention and suppression of fires.

3rd. That the interests so contributing, be given a voice in the selection of local wardens.

4th. That arrangements be made with the railways whereby trains with tank cars and proper outfit, and gangs of men, shall at a short notice be available for fighting fires, along or near railway lines.

5th. That men called out by fire wardens be paid as soon as discharged.

6th. That the origin of all bush fires be strictly investigated, and offenders rigorously prosecuted.

That the Bush Fires Act be amended so as to make it an offence to set out fires for any except domestic purposes, from the 1st of April to the 30th September, without a permit from the Fire Ranger, which permit, if issued, shall require the permittee to have on hand the necessary help and appliances to control the fire.

Also to make it an offence under said act for anyone to permit a fire to leave his property, or start a fire at any time and permit it to run at large.

That the system adopted in Ontario requiring fire patrol along railways during summer months be recommended for the Province of British Columbia.

That the sections of the Bush Fires Act applying to locomotives be made applicable also to engines used in logging operations.

That section six of the Bush Fires Act be amended to make it applicable all the year round.

RESOLVED, That an appeal be made to the Federal and Provincial Governments and the larger interests which will be beneficially affected by the extension of the Forestry interests for liberal financial assistance towards carrying out to the fullest possible extent the aims and objects of this Association.

WHEREAS the clearing of small areas by settlers in the midst of timbered sections of the different Provinces, fire being the means usually adopted, is a fruitful cause of the yearly destruction of great quantities of timber be it

RESOLVED, That in the opinion of this Convention no homestead or pre-emption should be granted on land more valuable for timber than for agricultural purposes, and that this





No. 1--The Chestnut as a Sprouter.



Convention urge on the proper authorities to make the necessary classification of the lands at the earliest possible date.

Votes of thanks to His Excellency the Governor-General, to His Honour the Lieutenant Governor and to the various Associations and persons who had assisted in the work of the Convention, especially to the press for their full and interesting reports of the proceedings.

The local committee in charge deserve all praise for the success of the Convention, and it was a matter of regret that the Chairman, Mr. C. M. Beecher, was unable, through illness, to attend. The Convention placed on record a resolution of sympathy with Mr. Beecher. Great credit is due to the Secretary, Mr. R. H. Alexander, upon whom fell the burden of carrying out the details of organization, for the completeness with which the arrangements were made.

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It is with regret that the Forestry Journal learns that Ontario has lost the services of Dr. Judson F. Clark, who has resigned from the position of Forester to accept the management of a large timber company in British Columbia. In Dr. Clark, Ontario had not only a scientist of more than usual ability, but a practical forester with a wide experience. In his many addresses and writings Dr. Clark has shown himself a master of forest economics, and though the principles which he has advocated in forest management have been criticized as being too highly ideal for the present political status of Canada, we are pleased to see that they are being adopted in Ontario in the recent timber sales.

It was understood that Dr. Clark was to have charge of the Forestry College to be established at Toronto University and his removal to British Columbia will be a serious loss to the development of that institution. We are glad, however, that he is bettering himself so decidedly financially, and it is not to be wondered at that the Government could not retain his services.

Though not in the public service we feel sure that the cause of forestry will still continue to receive Dr. Clark's attention, and we shall be able in a few years to see a practical demonstration of the principles of forestry in British Columbia.

## WOODLOT TAX EXEMPTION.

Under the terms of a bill introduced at the 1906 session of the Ontario Provincial Legislature by Mr. J. P. Downey, M.P.P., and subsequently passed, complete exemption of woodlands from taxation is now possible under certain conditions. This exemption depends, in the first instance, on the passing by any township council, of a By-law to allow this exemption, which may be either total or partial. Not more than twenty-five acres owned by any one man may be exempted.

What is Woodland?

The term "woodland," used in the act, is defined in the act. Such woodland must bear the following numbers of trees of the following diameters:

100	trees	over	8	inches	in	diameter,	or
200	"	"	5	"	"	"	"
300	"	"	2	"	"	"	"
400 trees of all sides.							

No land, however, is to be considered woodland if stock is allowed to graze in it.

Varieties of trees allowed.

The varieties of trees which are to be allowed are as follows: Coniferous (*evergreen*) trees: White pine, Norway pine, hemlock, white spruce, Norway spruce, tamarack, cedar.

Hardwood (or broadleaved) trees; oak, ash, elm, hickory, basswood, tulip (or whitewood), black cherry, walnut, butternut, chestnut, hard and soft maples, sycamore, beech, black locust and catalpa.

### HOW EXEMPTION IS TO BE SECURED.

After the passage of such a by-law as that described above, the owner of any woodlot who wishes to secure exemption from taxation on it, is to make application to the township clerk before February 1st. The township assessor is then to examine the woodlot, and, if he finds that it fulfils the conditions mentioned in the act, the exemption may be granted. Such exemption ceases if grazing is allowed in the woodlot, or if the lot is cut over.



## ADDRESS OF THE PRESIDENT, MR. E. STEWART, AT VANCOUVER FORESTRY CONVENTION.

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I shall not on this occasion weary you with any lengthened remarks on the subject of Forestry in general, interesting and inviting as that subject is. Neither shall I quote any figures to show the extent of the existing woodlands of Canada as I have done on other occasions, suffice to say that this country does possess a heritage in her virgin timber, the extent and value of which very few countries of the globe can equal, and I need not say that British Columbia, in this respect, is unrivalled by any Province of the Dominion.

Recognizing this fact, and with the belief that our people did not appreciate the value of, and were negligent in conserving its forests, this Association was organized a few years ago.

The aims of its founders were to enlist the active co-operation of the people in every Province in the subject, and not only of every Province, but of those living in the un-organized districts of the wilderness regions of the far North. They also saw the necessity of the cultivation of at least a limited number of trees on the prairie lands of the Northwest, if those regions were ever to contain the real homes of a contented people, and not remain merely grain ranches.

The result has shown that the most enlightened members of the community in every part of Canada recognized that the movement was worthy of their support and the attendance here to-day shows that this Province of British Columbia is not behind any of her sister Provinces of the east in her appreciation of the importance of the subject.

Gentlemen, the fact is, the people of Canada have, in the years gone by, utterly failed to appreciate the value of their possessions. Their horizon has been too circumscribed. In too many instances the undeveloped wealth, the natural resources, not only in timber but in minerals, in fisheries, as well as in agricultural lands, have scarcely been imagined.

We should be very slow in pronouncing any district as worthless. Who, only a few years ago would have imagined the Yukon to contain the mineral riches which the succeeding years have revealed there? Within this generation the United States purchased the whole of Alaska for a less sum than has been realized in one season from a single mining camp in that territory, and I venture to predict that future years will afford similar results from regions at present known only to natives of this country.

But I am supposed to confine my remarks in some degree at least to the subject in hand, and permit me to say that utility of forest growth is too frequently regarded only for the monetary value of the product it produces, in other words the timber product. Valuable as this is, it is by no means the only, perhaps not the main or chief benefit it confers. Imagine what would be the condition of this Province if by some dreadful catastrophe the whole forest covering of those hills and valleys were swept out of existence.

The spring floods would then descend the mountain sides in such force as to carry away the gravel from above and deposit it over the now fertile valley land. Such floods as you have occasionally experienced on the Fraser and other streams, would become of annual occurrence. This prodigal waste of water would be followed shortly after by summer droughts rendering agriculture unprofitable if not impossible.

The miner would soon find it unprofitable to continue his operations, owing to the want of timber and water, both of which are necessary for his work. This is no fancy picture of what would be the result. It can be seen to-day in the lower Alps in eastern France as well as in certain parts of every country bordering on the Mediterranean Sea, and in other parts of the world.

Every one who has come over the mountains on the Canadian Pacific Railway, must have been struck with the great destruction that forest fires have caused along the route. The greater part of this was done during the construction of the road, but even since then, the annual loss during the dry summer months, continued until a few years ago, when a system of patrol was established along the railway belt by the Dominion Government. The result of having such a system speaks for itself, suffice to say that during the past five years since the present system was established, very little valuable timber has been destroyed. If we compare the loss before this work was begun with what little has taken place since, or with what has occurred on any similar area of unguarded territory, I believe it will be found that the cost involved has repaid itself a hundred fold, and I hope that the public of this Province will stand by the Provincial Government in any efforts it may make in the same direction. I am glad to know that a beginning has already been made by a small appropriation by the Provincial Legislature for such a service, but it should be increased at least ten fold to be at all effective over such a wide district. But the Government can only act so far as the public will permit as represented by the members of the Legislature.

The people of this Province should not only commend, but demand immediate action to lessen, as far as possible, the annual

loss from these destructive fires. It took nature hundreds of years to create those valuable forests. Will you allow them to be destroyed in a day and deprive posterity for a century to come of their inestimable benefits?

Owing to those immense ice fields of the higher altitudes, this Province is furnished with an abundance of water at the source of supply. The forest covering on the mountain sides aids in forming a natural reservoir by which a continuous flow is maintained. Allow it to be destroyed and you will do your part in creating a mountain desert.

Mention has been made of reforestation. Fortunately, in this Province nature, unaided, is doing that for you. A visit to almost any of those districts which have been burnt over a few years ago, will show you a splendid reproduction of the original varieties rapidly growing up to take the place of the original forest. You will see in most cases a splendid growth of young cedar and fir coming on. Nature, with the munificence which characterizes her operations everywhere in this favored land, seems in this instance, to be putting forth extra efforts to reclaim lost ground and all she asks is that you will not prejudicially interfere with her operations.

The costly work of artificial tree planting need not be attempted. Keep the fire out of this young timber and there is no reason why future generations may not be as abundantly supplied as you are to-day. It is neither good forestry nor good business to leave unutilized the product of the forest. As President Roosevelt pertinently says, the product of the forest is for use. And as this Province has a very large percentage of land unsuited for agriculture, but admirably adapted for the growth of timber, it follows that forestry here is a matter of great importance.

From what I have been able to learn of British Columbia, and I have had an opportunity of seeing a good deal of it, I am more than ever impressed with the vastness of its natural resources. Its fisheries, its timber and its minerals, almost overwhelm the imagination. Its future place as a producer of the economic minerals, will undoubtedly be foremost, but here again the timber is a necessity.

It was stated by an authority at the American Forest Congress that the mines of the United States consumed more timber than the railways, enormous as is the consumption of the latter. This being the case, it is apparent that those who are most interested in the success of the mines should not be indifferent regarding the forest.

The time was when the lumberman of the country looked with suspicion on the forester. Probably this was quite as

much the fault of the forester as that of the lumberman, and arose from a misunderstanding, the lumberman having the impression that the forester, if he had his way, would prejudicially interfere with his operations, and the forester blaming the lumberman for destroying the forests.

Now it is scarcely necessary to say that no intelligent forester would be so unwise as to prevent the utilization of full grown timber. His mission is rather to use his influence in such a way that a permanent production may be constantly maintained. But nothing serves so well to unite people as a common enemy, and that was not wanting in this case. The ubiquitous forest fire, to which I have already referred, and which I believe has destroyed in Canada, ten times as much timber as the lumberman has ever cut, furnished the rallying point. So alarming was this destruction in every Province, that every citizen, worthy of the name, became interested, and the authorities were urged to adopt a protective service. Never was a more reasonable request made. The public, in most cases, are the owners of the timber, it being principally on unsettled lands still held by the Crown, and even where timber berths have been sold to individuals, the Government still receives a royalty on the cut. It was pointed out that no city or town would think of doing without a fire service for the protection of buildings, which if burnt, could be rebuilt within a year or so, whereas, if a forest is destroyed it takes a century to replace it. In this movement for protection the lumberman became a forester. Again with the permanent tenure of timber berths, the intelligent lumberman is not satisfied to ignore the growth of young timber that is coming on to take the place of what he has removed, and the day has now arrived when I believe very many of our lumbermen are beginning to so work their limits that the ground, which has for ages been producing timber, one crop succeeding another, may continue to afford him a continuous supply.

We should not forget that the most reliable statistics show that the world's supply of timber is fast diminishing, while the demand is enormously increasing. Time will not permit me to quote the opinions of many of the best authorities in the world, backed by statistics on this point. I will only, however, trespass on your time to quote from an article which appears in the last July number of the "Nineteenth Century," written by Dr. John Nisbet, (late of the India Forest Service), on timber planting on waste lands in the British Isles, in which, after referring to the fact that Great Britain had heretofore been able to supply her timber through the enormous shipping facilities at her command, goes on to say that "the whole economic position has been entirely changed within the last thirty-five years, and the future outlook has, of course, thereby become profoundly affected.



Thirty-five years ago the population of the United States was only about forty-one millions and now it is over eighty millions, while that of Germany was forty millions and is now sixty-one millions. In both of these cases, the United States and Germany had thirty-five years ago, more than sufficient timber of home growth to supply all their internal requirements, but now they have become, owing to their increase of population and industries, far from self supporting, and are more or less dependent on the supplies of other countries.

"Then, the American resources seemed ample; now they have become so diminished as to have given rise to great and well founded anxiety for the future. This shortage in home grown wood must be supplied by imports; and as the great bulk of the timber required by ourselves and by these, our two great competitors is the light wood of coniferous trees, of which the chief stores are now to be found in Canada, Russia and Scandinavia, the amount we shall have to pay for this class of timber, (which constitutes about 90% of our wood imports), must be, to a considerable extent, determined by the requirements of the United States and Germany and by the price to which they will raise this raw material at the sea ports in the countries having surplus timber available for export."

He goes on to say, "that unless Great Britain can arrange some sort of preferential treatment with Canada for her timber exports, there is every probability that the annual sum she will have to pay for her national timber bill will be very much greater than at present, and how large this sum already is, seems not to be generally realized."

It is an extraordinary thing that notwithstanding the increased use of stone, cement, brick and iron for building purposes, the per capita use of timber has gone on increasing annually within recent years. In this connection the same writer says: "In 1882 the population of the British Isles was thirty-five and a half millions, and the timber exports were 18,300,000L.; in 1903 the population was forty-two and a quarter millions, and they imported wood and timber to the value of 29,300,000L, thus showing a rise of over 50% in the total value of the imports as compared with an increase of only 19% in the total population."

A Committee on Forestry, appointed by the Home Government in its report in 1902, says; "The world is rapidly approaching a shortage, if not actual dearth, in its supply of coniferous timber, which constitutes between 80 and 90% of the total British imports."

With the nations of Europe looking to us for a future supply; with the ever increasing demand from South America and the Orient and perhaps more important than all, the increase in

home consumption, especially with the rapid settlement of our plains region, there can be no question that high as timber is to-day, its value in the future will certainly increase.

The intelligent lumberman is per force a forester, and I am glad to say that ever since the Canadian Forestry Association was organized the lumbermen have been among its leading spirits and the invitation of the Association by the Western Lumber and Shingle Manufacturers' here, is an evidence that they appreciate the work that the Association is endeavoring to do.

I trust that good results will follow the deliberations of this Assembly.

I know it is quite possible to have interesting discussions, and yet fail of accomplishing what should be done, and I would suggest that you appoint a Committee on Resolutions, so that a united expression of the meeting may be obtained on some very important matters, and as this meeting is in British Columbia, I think that the members of the Association will agree that it will be both profitable and fitting that Forestry matters, as they relate to this Province, should be given first place, and I would further suggest that certain amendments to your Bush Fires Act should be considered. One of the most important is to prohibit the setting out of fires in clearing land within any proclaimed fire district during certain months of the year, unless the party setting out the fire has obtained a permit from the Fire Warden of the District in question.

Another is the question of a patrol service on Provincial timber lands, to which I have already alluded.

We frequently hear it said that certain fires did not burn any timber large enough for commercial purposes, only small stuff, is the expression, but let me say that the farmer might as well consider his unripe crop valueless, as for the nation to place no value on the splendid young growth of timber that you will see, if you have an opportunity of visiting any of the surrounding country that has been swept by fire some years ago. It is only a difference in point of time, and a score of years in the life of a nation, is less than one in that of an individual.

Gentlemen, we should remember that this is an inheritance that nature is bestowing on succeeding generations, and the Government of the Country should recognize that they are Trustees of an Estate, and that their duties are not only to those whom they at present represent, but to future generations as well.

The favorite maxim of Adam Smith, that Governments exist for the protection of life and property, has to be read in its broadest and most comprehensive sense in a new country with growing, as well as undeveloped, resources.



No. 2—The Chestnut as a Sprouter.





# TIMBER CONDITIONS OF BRITISH COLUMBIA.

WITH RELATION TO EXTENT, REVENUE AND LEGISLATION.

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BY HON. R. F. GREEN, CHIEF COMMISSIONER OF LAND  
AND WORKS.

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It is very gratifying for me to have the honour and pleasure of meeting such a representative gathering of patriotic Canadians as are assembled here to-day in the commercial Capital of British Columbia, for I look upon the work undertaken by the Canadian Forestry Association as patriotism of the highest quality. Your work, gentlemen, as it presents itself to my mind, is essentially a labour of love, in which self interest has no place, your sole aim being the protection and perpetuation of the forests of Canada for the use and benefit of future generations. Prior to the foundation of your Association, a few individuals, scattered throughout our broad Dominion, devoted their time and energy to the subject of forestry, but it was only after many disheartening failures that these enthusiasts succeeded in arousing public interest, and were at length rewarded by witnessing the crystallization of their ideas in the birth of the Canadian Forestry Association. It is unnecessary for me to trace the progress of the Association or to enlarge upon the good work which it has accomplished, for the results proclaim themselves from the pages of the statutes of every Province from the Atlantic to the Pacific. The earnestness, patience, and pertinacity shewn by the Association throughout its campaign for reform in the laws relating to forestry, and the methods of lumbering, cannot be too highly commended. The task undertaken is a gigantic one—the awakening of a whole people to the realization of a danger which, to the thoughtless majority, seems so remote as to be imaginary—and like all great movements for the betterment of humanity, complete success can only be achieved by such ceaseless and untiring effort as will win the weight of public opinion, and the sympathy and co-operation of the whole population of Canada, to the objects of the Association.

I have alluded to those enthusiasts on the subject of forestry, who made it a study long before forestry became a live issue in the public mind of Canada, and my thoughts are drawn to a central figure in the agitation which resulted in the formation of this Association and the subsequent good work accomplished—

Sir Henri Joly de Lotbiniere—that grand old man who may easily be granted the father of Canadian Forestry—a gentleman whom we are all proud to honour with our love and esteem. His work in the cause of forestry is of such a nature that it stands as an example to every person who professes an interest in the subject. Not content with spreading the propaganda by voice and pen, Sir Henri, with his own hands, made plantations of forest trees in Quebec and British Columbia and watched and tended their growth from the seed, thus securing practical information of great value, which he takes the greatest pleasure in sharing with all those who seek to profit from the results of his experience. Sir Henri will never need a monument if his dream of Canadian Forestry be half fulfilled, for what could be more noble tributes to his memory and his life work than the afforested prairies of Canada and the reforested timber lands of the older provinces—actualities which are made possible through the efforts of the Association which he founded. British Columbia is so very much a “wooded country”—so lavishly endowed with timber—that its people are hard to move to a sense of the importance of forest preservation—indeed the best years of the lives of many of the old timers were spent in destroying the big trees and thick underbrush which covered the soil now given to the production of bread, beef, and fruit, and it was a hard task for any man to convince those pioneers, or their descendants, that a day would ever dawn when the forests of British Columbia might be depleted—as well attempt one hundred years ago to arouse enthusiasm in forest preservation in the breasts of the men who were chopping out homes in the woods of Upper and Lower Canada, or the pioneers of Nova Scotia and New Brunswick. Sir Henri, however, after much effort, enlisted the interest of a number of gentlemen who formed the British Columbia branch of the Canadian Forestry Association, and who worked faithfully under his leadership to advance the objects of the Association.

The progress of the movement inaugurated by Sir Henri has been naturally slow, for one of the greatest stumbling blocks to the settlement of our public lands is the problem of clearing them of timber, cheaply and effectively. The cost of clearing land deters many a settler from staking a pre-emption, for labour is high and but few individuals are willing to undertake the work single handed. Speaking in round numbers the land area of British Columbia is 250,000,000 square acres, of which about 182,000,000 are forest and woodland, a large portion of which is classed as timber land. So dense are our forests and so big our trees that 20,000 to 50,000 feet, board measure, to the acre is no uncommon yield, but reducing an average of these figures to a reasonable amount we have in store a stupendous total of available timber.

Now, according to statistics, the lumber cut from 1888 to 1904, inclusive (17 years), aggregated 2,569,756,262 feet—a mere nothing compared with the grand total—and taking the average yearly cut for the 17 years, we find if that average were maintained for the next 200 years, our forests would still be far from exhausted. This is a hopeful outlook for the people of British Columbia, and the new provinces lying east of the Rocky Mountains, whose inhabitants must look to us for their supplies of lumber, but even with what seems at first blush an embarrassment of riches, we must not assume that this forestry treasure is inexhaustible. Prudently managed it will last to the end of time, but if wasteful lumbering methods (so general in the past) are persisted in, and fires allowed to run unchecked, our magnificent forest heritage might be dissipated in a generation or two.

In the Colonial period of British Columbia's history the question of forest preservation was given little, if any, consideration. What settlements existed were confined to the sea coast and the banks of the Fraser River. The great hinterland was unknown—a pathless wilderness—the home of a few scattered Indian tribes, and dotted here and there with the trading posts of the Hudson Bay Company. The policy of the Government of those days was to clear the land in and about the settlement at any cost, and the methods used were decidedly not in the line of forest preservation. The gold seekers came next, and in their eager quest for treasure, they naturally regarded the forest as a barrier to success and unhesitatingly destroyed it in order to clear the way for their mining operations.

It was not until 1874 that the Government of British Columbia took steps to preserve the forests. In that year what is known as the "Bush Fire Act" was passed. It provided that any person convicted of igniting fires in the woods during the months of June, July, August or September, and failing to thoroughly extinguish the same, should, in the case of damage resulting, be liable to a fine of \$100.00, or three months' imprisonment. The same punishment was provided for persons allowing fire to spread from their own property to that of their neighbours, or to adjacent public lands. This Act was inoperative, however, except in districts of which two-thirds of the residents petitioned the Lieutenant-Governor-in-Council for its enforcement. In 1887 the "Bush Fire Act" was made general throughout the Province, and in 1896 the Lieutenant-Governor-in-Council was given power to define any portion of the Province as a fire district, and it was made unlawful to set out or start fires between the first of May and the first of October, except for the purpose of clearing land, cooking, obtaining warmth, or for industrial purposes. Provisions were made in this Act, and subsequent amendments passed providing for safeguards against the spread

of fires, and the penalties were increased to a maximum fine of \$200.00, and not less than \$50.00 in every case of conviction—half the fine going to the prosecutor. Convictions under the Act do not bar individuals whose property has been injured, or destroyed, from suing for damages. Railway companies are made liable for damage done through the medium of their locomotives, and it is laid down that all engines shall be equipped with approved appliances to prevent the escape of sparks and cinders. Neglect to provide such appliances constitutes an offence punishable by a fine of \$200.00 in each case, as well as liability arising out of a civil action. Under the Act of 1897, every Government Agent, Gold Commissioner, Timber Inspector, Forest Ranger, Mining Recorder, Provincial Police Officer, or Constable, is constituted a fire guardian, and each of them is enjoined to prosecute every case which may come to his knowledge. Every pre-emptor of Crown lands is furnished with a copy of the Act at the time of his application. Enforcement of the law is difficult in a territory so vast as British Columbia, and in a majority of cases evidence is difficult or impossible to obtain. The miscreant who deliberately sets fire to the woods is usually careful to hide his guilt, and the hunter or prospector who leaves his camp fire extinguished, or thoughtlessly throws a lighted match, or cigarette stump, or "heel" of his pipe into the underbrush, will in every case proclaim his innocence when confronted with the serious results of his carelessness. Cases are rare in which positive evidence can be secured, and magistrates are loath to convict on circumstantial evidence, where the accused is a poor man to whom the infliction of a heavy fine would prove a great hardship. Many forest fires are also caused by lightning.

The rigid enforcement of the "Bush Fires Act" is impossible without the earnest co-operation of the people themselves. The vigilance of an army of Forest Rangers would prove inadequate to prevent the occurrence of fires without the sympathy and assistance of the community. Eternal vigilance on the part of every man, woman and child in British Columbia is necessary to prevent our woods from suffering the scourge of fire, and in order to create a general interest in the subject of forest preservation the people must be educated to a sense of its importance to the future of the country. The Canadian Forestry Association has undertaken this work of education and every assistance should be extended to enable it to make its work thorough from one end of Canada to the other. The schoolchildren should be enlisted in the army of foresters and taught that the wanton destruction of a tree is a crime against society. I would like to see a copy of the Association Journal placed in every school-house and in every home in Canada, in order to awaken universal interest in the subjects with which it deals. It is to the lumberman, however, that the



Association must look for immediate results. Their interests should prompt them to bestow the utmost care and attention to the prevention of fires, and, if they are in the business for more than temporary profits, they should be possessed of sufficient public spirit to adopt the least destructive methods of logging and so dispose of tree-tops, and other debris, as to minimize the danger of fire and to encourage the second growth by clearing the ground as much as possible. The Government of British Columbia has done and is doing all in its power to prevent forest fires, and during the present season the fighting of fire was carried out in many parts of the Province with gratifying results. The Dominion Government officials in the Railway Belt have also worked hard to the same end, and through the united efforts of the federal and provincial fire fighters much valuable timber has been saved from destruction. The campaign inaugurated by the present Provincial Government, will be vigorously prosecuted in the future to the fullest extent which our funds will permit, and we look confidently to the people of the Province to assist us in every way.

Prior to 1871, when the Crown Colony of British Columbia became a Province of the Dominion, the lumber industry was comparatively insignificant. All the lumber cut from the foundation of the Colony in 1856 was estimated at 250,000,000 feet. Indeed, strange as it may appear, a great deal of the lumber used in those days was imported, and there is one house in Victoria to-day, within a hundred yards of the Parliament Buildings, the lumber in which was brought from San Francisco. The first legislation regulating the cutting of timber was embodied in the Crown Lands Act, 1870, which provided for the granting of leases by the Governor-in-Council to an unlimited acreage for the purpose of cutting the timber, subject to such rent as might be determined by the Governor-in-Council. The ground covered by these leases was open to pre-emption but the pre-emptor was debarred from cutting timber other than for his own use. This Act was re-enacted by the Provincial Legislature in 1875, but it does not seem, however, that advantage was taken of it to any extent, as it was not until 1879-80 that any revenue was derived from timber rentals. By an amendment to the Act passed in 1888, the tenure of timber leases was fixed at 30 years and a rental of ten cents per acre was charged and a royalty of fifty cents per thousand feet on all timber cut imposed. The lessees were required to build a mill with a capacity of 1,000 feet per day for each four hundred acres covered by the lease. This Act also provided for a penalty of \$500.00 or thirty days' imprisonment for cutting timber from Crown lands without authority. Since 1892 no leases have been granted of timber limits without the limits being offered to public competition and the lease was

granted to the person offering the highest cash bonus. The rentals were increased in 1895 to fifteen cents per acre, and again in 1903 to twenty-five cents per acre, subject, however, to a reduction to fifteen cents per acre upon the lessee proving that he had a mill appurtenant to his lease, capable of cutting at least 1,000 feet per day for each 400 acres included in his lease in actual operation, and cutting that amount at least six months in the year. By the Act of 1888, the Chief Commissioner of Lands and Works was empowered to grant special licenses, valid for one year, to cut timber from Crown lands. The area covered by the license was limited to 1,000 acres, and the fee paid for the license was \$50.00. Subsequently the area was reduced to 640 acres, to be taken up in one block with the boundary lines running to the cardinal points, and the fees have been increased to \$140.00 per annum for licenses covering lands west of the Cascades, and \$115.00 per annum for licenses east of this range. The Act of 1888 also authorized the issuing of Hand Loggers' Licenses—all timber cut under license being subject to the royalty of fifty cents per thousand. The Hand Loggers' license was a personal one, and only gave authority to the person named therein to cut timber as a hand logger. The fee was \$10.00 per annum and the logger had the right to cut timber from any Crown lands that were not held as timber limits under lease or license.

When the present Government assumed office, there were thus three methods by which a person could obtain the right to cut timber from Crown lands, namely, under lease, under special license, and under hand loggers' license. It was deemed advisable to simplify this state of affairs, and in 1905 the provisions of the Land Act authorizing the granting of timber leases were repealed, so that now the right to cut and carry away timber can only be granted by way of a license. The lumbermen, however, complained that they were much handicapped in their business and the industry retarded by reason that special licenses were not transferable, and only renewable at the discretion of the Chief Commissioner and not as a matter of right; that such a license gave no stability of title and that capital could not be secured under such conditions. The Government considered their complaints to be well founded, and by the Act of 1905 it was provided that licenses then existing should be transferable, and the holders thereof could elect to have their licenses made renewable for sixteen successive years at the same fees per annum as were then paid therefor, namely, \$140.00 or \$115.00, as the licenses covered lands west or east of the Cascade Mountains. The royalty payable on timber cut under such licenses was increased to 60 cents per thousand feet. The same Act provided that all special timber licenses thereafter issued should be transferable and renewable for 21 successive years. This legislation

has completely removed all complaints about the lack of stability of title under the license system. Millmen can now enter into large contracts and carry on their business with greater security knowing that they can have their licenses renewed from year to year. Capital can now be secured and the result of this legislation has altogether proved most beneficial both to the lumberman and the lumber industry, and therefore to the people as a whole.

One of the most important features of recent legislation in British Columbia respecting the timber industry is that which was passed with a view of having British Columbia timber manufactured by British Columbia people in British Columbia. The shipping of British Columbia logs to the other side of the boundary line had reached formidable proportions, and our lumbermen were forced to look idly on, whilst their rivals from Puget Sound took their raw material from British Columbia, converted it into all kinds of lumber and supplied the settlers of Alberta, Saskatchewan and Manitoba with British Columbia lumber at prices with which our millmen could not compete. This state of affairs worked a double wrong to the Province, for it not only deprived our lumbermen of all chance of profit on their investments, and our workmen from earning a livelihood, but threatened the depletion of the most valuable timber lands along the coast for the benefit of American millmen. The first step taken to put an end to this state of affairs was in 1901, when the Legislature enacted that all timber cut from leaseholds must be manufactured in the Province, otherwise the lease would be cancelled. This enactment has been kept on the Statute book, and in addition in 1903, a tax was imposed on all timber cut and not subject to the payment of royalty, that is on all timber cut from lands for which Crown Grants were issued prior to April, 1887, varying, according to the size and grade of the timber from \$1.00 to \$4.00 per thousand feet, board measurement, on spars and saw logs; from .01 to 2½ cents per lineal foot on piles and poles under 11 inches in diameter; and from \$2.00 to \$4.00 per thousand feet, board measurement, on piles and poles over 12 inches in diameter.

Then again at the last Session of the Legislature an Act, known as the "Timber Manufacture Act," was passed whereby all timber cut from ungranted lands of the Crown, or from lands thereafter granted lying west of the Cascades, must be manufactured or used in the Province and authorizing any such timber, or any steamboat towing the same, to be seized and detained when it shall be made to appear that it is not the intention that such timber is to be used or manufactured here. The action taken by the Legislature to compel timber cut from our Crown lands to be manufactured at home has been hailed with satisfaction, and the effect has been most beneficial. It may in a way



be said to be the turning point in the history of our lumber industry. Previously our lumber companies, handicapped by the competition of Washington millmen manufacturing our logs and sending back the finished product to Canada free of duty, were barely able to make ends meet, and in some instances the local mills were actually losing money. This has now all been changed. Capital, which had held back—hesitating to embark in a business in which the chance for success was problematical—hesitates no longer. New mills equipped with the most modern machinery have been and are being established. A number of American millmen, realizing that they can no longer depend on British Columbia for a supply of raw material, have come to the Province and started manufacturing here on an extensive scale, and many others are following them. The great influx of settlement on the prairies on the other side of the mountains has given a great impetus to the industry which has rapidly recovered lost ground, and which to-day, viewed from every standpoint, stands upon a most satisfactory basis.

A perusal of the output during the past few years will shew this. You will find a statement of this output on page 15 of Bulletin No. 21, copies of which are before you, and it will not be necessary for me to weary you with many figures. You will note that in 1888 only 25 mills were in operation. To-day there are 150 mills all working overtime and unable to fill the orders that are pouring in. In 1888 the output was 31,868,884 feet. In 1903 it was 317,551,151 feet. In 1904 it increased to 325,271,568 feet, and in 1905 to 450,385,554 feet. The output for the first six months of the present year was 235,387,000 feet—considerably over 50% of the total cut for the preceding year—indicating that 1906 will eclipse all former years in the volume of business in lumber.

But whilst the lumber industry is a most important one in British Columbia in relation to the development and progress of the Province, it is no less important in relation to the provincial revenue. In the fiscal year 1879–80, which was the first year any revenue was received from timber, the amount received was \$1,263.41. In 1889–90 it amounted to \$24,670.57. In 1899–00 to \$136,330.00, and in 1904–05, the last fiscal year for which reports have been issued, the revenue received amounted to \$486,516.46, being one-sixth, or nearly 17%, of the total revenue of the Province. It will thus be readily seen how important it is from a Government standpoint, that everything possible be done to encourage and foster an industry from which so large a proportion of the provincial revenue is derived.

With regard to the prospects of the pulp and paper industry there is much to be said. The supply of pulp wood, recognized as such, is enormous, and if the opinion expressed by Professor



Macoun be verified, that is that the Douglas fir is a paper making wood, there is practically no end to the possibilities of the business. If the waste of the fir could be converted into a merchantable pulp it would prove a boon to the lumbermen, and would go a long way towards removing one of the most prolific causes of forest fire, in the way of turning to use tree tops and other waste product which is now allowed to accumulate in the woods. Some years ago the Legislature granted power to the Lieutenant-Governor-in-Council to enter into agreements with and grant concessions of wood pulp lands to companies desirous of embarking in the enterprise. Several tracts of land were set aside in reserves to allow these companies to prospect for and locate areas of pulp wood, and select water powers for the operation of their plants. After selection, leases were granted on special terms which included the establishment and operation of pulp and paper mills, within certain time limits. Several companies took advantage of the law and considerable work has been done in cruising, surveying, and other necessary preliminaries. So far, however, the actual work of manufacturing has not been reached, although some of the companies have begun the erection of buildings and the installation of machinery. The chances for profitable business in pulp and paper making on this coast are unsurpassed, as the shipping facilities are cheap and adequate, rendering the markets of the world open to the trade. The Oriental countries afford a splendid market, and now with the trans-isthmian railway across Mexico completed, and the establishment of a steamship line from our ports to those of western Mexico, the whole of the Atlantic sea-board is thrown open to our trade in paper, pulp, and, in fact, to every product of the Province. The Panama Canal is, as yet, a dream of the future, but the trans-isthmian railway is a reality, and our shortest, cheapest, and most desirable freight route to the Atlantic.

One word in conclusion with reference to legislation. I feel sure the provincial lumbermen will agree with me in saying that the terms imposed by the Government of the present day are not onerous, or greater than the industry should bear considering the requirements of the Province. In this age conditions change rapidly—and particularly so in a new and rich Province like British Columbia, which is on the threshold of a great expansion. But no matter how great the development and progress the future may have in store for us, it must, to a very considerable extent, depend on the development and progress of the lumber industry; and, no matter how conditions may change, or what changes in legislation such altered conditions may demand, no Government can ever afford to enact any legislation that will, in any way, check or embarrass, or in any way interfere with the development of the lumber industry on

which the progress of the Province so much depends, and from which the Government derives such a large proportion of its revenue.

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### THE CHESTNUT AS A SPROUTER.

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The Chestnut (*Castanea dentata*) is almost unrivalled as a sprouter, and this marked and valuable characteristic is well illustrated by the accompanying reproduction of photographs furnished by Prof. Judson F. Clark, all taken in Southwestern Ontario. In No. 1 the sprouts are about 12 years old. No 2 shows three fine trees, 14 to 18 inches in diameter, springing from one stump. These would make excellent ties or telephone poles. No. 3 illustrates sprouting from a living tree. The stump of the mother tree, which was cut a few years ago, is about five feet in diameter and the sprouts are about 15 to 18 inches in diameter. The chestnut, on account of its straight splitting and desirable quality when used in contact with the soil, is in great demand for fence posts and similar purposes.

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Henry John Elwes and Augustine Henry are about to publish "The Trees of Great Britain and Ireland," and judging from the prospectus and the specimen illustrations which accompany it, their work will be one of inestimable value to everyone interested in Forestry or forest trees. Five years have been given to the preparation of this work, which is published privately by the authors. The first volume has already been issued, the second is in the press and the other three volumes will appear shortly. The object of this work is to give a complete account of all the trees which grow naturally or are cultivated in Great Britain, and which have attained or seem likely to attain a size which justifies their being looked on as timber trees. About 300 species of trees will be described and figured, several illustrations in many cases being necessary to show one tree. The illustrations are beautiful reproductions of photographs or paintings, many of them made specially for this work.



No. 3—The Chestnut as a Sprouter





## LUMBERING CONDITIONS ON THE COAST OF BRITISH COLUMBIA.\*

BY R. H. ALEXANDER, VANCOUVER, B.C.

Mr. President and Gentlemen:—

The subject on which I have been asked to make a few remarks might, at first thought, be considered somewhat antagonistic to that of Forestry, as the Lumber industry is occupied chiefly in the destruction of the forests rather than preserving them, but in reality the subjects are intimately connected. The Lumber Manufacturer's vocation is the conversion of the raw supplies of the forest into a marketable commodity for the use of man, and the object of the Forestry Association I take it, is to conserve the forest so as to ensure an ever recurring supply. I would like to put the importance of this to the general community by making a comparison with the farmer, who is looked upon as the backbone of the country, not that I wish to decry the importance of the wheat industry, but it appears to me that the produce of the forest is hardly looked upon in the same way. Take one acre of ground producing 20 bushels of wheat, this would equal 1,200 lbs., one acre of average timber land in British Columbia would yield 20,000 feet, weighing 3 lbs. per foot or 60,000 lbs., so that it would take the farmer fifty years to furnish as much produce for railway transportation as the lumberman does in one.

The money expended in marketing the crop of this acre of timber would also represent \$200, about 30 years of the farmer's expense. The exhaustion of the forests of a country means the extinguishment of its lumber trade, hence the importance of the scientific treatment of our forests, which the Forestry Association is endeavouring to bring about.

I need hardly, when addressing a gathering of Canadians, enlarge on the importance of the lumber trade, as they are all familiar with the great role it has played in the development of the Dominion; furnishing direct employment to a large portion of its population, consuming great quantities of the product of the fields and manufacturing establishments, and besides building up a merchant marine of our own, attracting vessels from all quarters for the transportation of the product of the lumber mills and camps, and last but not least, furnishing a large proportion of the revenues of the Provincial Governments.

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\* Read at the Forestry Convention, Vancouver, B.C., Sept. 27, 1906.

In all of these respects the Coast District of British Columbia has largely contributed, and the improvement of general conditions on the Coast is very greatly coincident with the expansion of the Lumber Trade.

The first mills in the Province were at Esquimaux and Sooke, on Vancouver Island, and were only for the requirements of the early settlers. The first mill of any size intended for the prosecution of export business was established at Alberni on the west coast of Vancouver Island about 1861 or 1862, but the business did not prove successful and was in operation but a few years when it was closed, and the machinery sold to some of the mills on Puget Sound. There was a small saw mill at New Westminster in 1862, catering to the local trade, and which shipped I think one cargo abroad. Parties who had been connected with this enterprise started the first mill on Burrard Inlet a year or two afterwards at Moodyville, which was followed by the building of the Hastings Mill on its present site in 1865, and with the erection of these mills the foreign lumber trade of British Columbia may be said to have commenced. For a number of years the foreign trade of the Province averaged from 25 to 35 million feet annually, until the Chemainus mill came into operation, since when the trade has varied from fifty to eighty million feet per annum. This year the Fraser River mill has joined the export shippers, and the foreign shipments will probably reach 85 million feet, the largest volume since the inception of the business.

Until the construction of the Canadian Pacific Railway there was no market available but the foreign, and large quantities of lumber that, under other conditions would have found a sale, used to be burned as the only way for its disposal. The advent of the Canadian Pacific Railway opened a market to the east, and mills began to multiply. It was a long time before our Douglas fir established itself, but it crept further and further east until now we have customers even on the seaboard of the Atlantic provinces, and the quantity being shipped in that direction is ever increasing. Our export trade is distributed all over the world, shipments being made to Australasia, China, Japan and occasionally to India, Central America, Peru, Chile and the Argentine Republic, the United Kingdom, France and Germany; it has even penetrated to Baltic ports, which might appear like sending coal to Newcastle, and is being used in the modern development of that ancient country Egypt, and aiding in the building of Johannesburg and the winning of gold in the Rand mines of the Transvaal.

In several of these markets however, our wood is not in general use, but only taken in the form of special sizes and lengths that cannot be obtained elsewhere, our great distance from the points of consumption and costly transportation mili-

tating against it being used in a more general way. Until recently the transportation of lumber has almost entirely been left to sailing vessels, but steam is now competing for the business, and when by this means these distant markets can be reached more quickly, we may confidently expect our trade with them to increase. With the expansion of the export trade it is interesting to note the increase there has been in the size of the vessels used. In the early days of the trade a vessel carrying over 400,000 feet was a large one, and to supply a cargo of a million feet was an undertaking so colossal as to make a mill manager stand aghast, while now it is a difficult matter to obtain vessels to carry such a small cargo, and steamers carrying 3,000,000 feet are not uncommon visitors.

Coincident with the increase in size of the vessels, has naturally been the increase in capacity, and improvement in the machinery of the mills, from the mill of early days producing 50,000 feet in which a great deal of manual labor was employed, to those of a capacity of 200,000 feet per day, equipped with all the latest machinery and labour saving devices, whilst the working day has been reduced from 11½ hours to 10.

In 1886, when the Canadian Pacific Railway reached Vancouver, the output of the Coast mills of British Columbia did not exceed seventy-five million feet, and this year, including the shingle industry, will reach 525,000,000.

In that year the revenue arising from the forest was but \$3,768.00, while last year it amounted to \$578,748.00. In making this comparison, however, a large share has to be credited to the growth of the lumbering business in the interior of the province, which will be referred to more particularly by a later speaker. The development of the shingle industry has also greatly assisted this result, as at the commencement of the same period of twenty years, there were only a few machines in use supplying the local requirements and finding it difficult to supplant the old hand shaved shingle; there are now 155 machines in operation, capable of turning out one billion shingles per annum, and the excellence of our manufacture has not only obtained for B. C. shingles the trade throughout Canada, but has gained them a preference in the United States.

The increase in the manufacturing of lumber of necessity required an increased production of the raw material from the forests and an improvement in the methods of logging.

In the seventies, I think the only two mills having leases of timber land were the Hastings mill and the Moodyville mill, for which they paid the Provincial Government one cent per acre without any further dues, and the revenues could not have amounted to more than about \$600.00, from which it has increased as before mentioned to nearly \$600,000. Whilst these



mills operated their own camps on their leases, others cut timber wherever they felt inclined, no one then placing any value on the standing timber. Oxen were the motive power used for the transport of the logs to the water, and the most important man in the camp and the one getting the highest wages was the "bull puncher," or teamster, who gained the above name from driving with a goad stick, in the end of which was inserted a brad which was liberally used, along with a good deal of strong language to make the cattle exert themselves. When moving from camp to camp, a teamster generally carried his goad stick as a sort of insignia of office, and it may be a surprise to hear that \$5.00 was an ordinary price for a good hickory goad stick. The teamster's wages ran as high as \$125.00 per month without any deduction for lost time, and it was a sight to see their skilful manoeuvring of a team of twelve and sometimes fourteen "bulls" in the dense woods. At this time there were also a number of what were called hand-loggers, who finding a locality where the timber grew on a slope close to the beach, with the aid of a jack screw, wedges, an axe and a crosscut saw, put in the water no inconsiderable part of the log supply. Later on the camps substituted horses and mules as being faster than oxen, but all these methods have practically been superseded by the use of steam haulers, with fully equipped railways for the main roads where the operations are of sufficient magnitude.

Until comparatively recent years, the only lumber manufactured by the mills was the Douglas fir, which I regret to say is known abroad more generally under the commercial name of "Oregon Pine." How it received that name it is difficult to account for, as the first shipments were sent abroad from Puget Sound, then Washington Territory, but the name has remained and it is most difficult to change a name which by use has become a familiar commercial term. Our B. C. product, I am pleased to say, has in many instances a preference as having a closer grain, and in Europe at least, is frequently referred to as "Columbian Pine" in contra-distinction to the other. Our other woods of commercial use are cedar, spruce and hemlock. Our cedar furnishes the material for our large shingle trade, and is in request also for finishing lumber and the manufacture of doors and sash. Spruce is not so plentiful, but the upper grades find a ready sale in various forms, while the lower furnish the material for box-making. The last wood I have mentioned is hemlock, and hitherto hardly any use has been made of it except for piles and for no other reason that I know of than its name. The hemlock of the Pacific Coast is a very different tree from that in the east, being much longer in fibre, it is somewhat harder and heavier than spruce, though less than fir; experiments with it have proved it a first class wood for interior finish and I fully believe that its use will



quickly increase when prejudice is overcome, and will be esteemed as highly as our fir is at present. From a forestry point of view, I am sure it will prove of the highest value, as it rapidly reproduces itself and flourishes well in heavy shade. A walk through our park will furnish our visitors interested in forestry with examples without number of this tree having reproduced itself amongst dense underbrush, on fallen and partially decayed trees, and even on the tops of stumps of fir trees which have been felled, and it has been described by one of the timber experts connected with the University of Washington as an "ideal tree for re-afforestation on account of its ability to exist under the conditions just mentioned."

Logging operations on the coast of British Columbia will always be expensive and rapidly increase in cost from the general characteristics of this country. This generally rises sharply from the sea shore without any large area of fairly level land; this necessitates constructing roads from the shore at several different points to obtain the timber from one moderately sized limit, and it becomes a question whether there is enough timber tributary to any one road to justify its construction. As the timber within easy reach of the shore becomes exhausted, this condition will be intensified in proportion to the length of the roads necessary and only large compact areas of timber will justify the expense of building railroads many miles inland. The cost of working small areas will rapidly increase and I am therefore of opinion that the price of the raw material will have to increase accordingly. If my view is correct, it follows as a certainty that the price of the manufactured article must increase also, and this I think will be the case generally on the Pacific Coast. The rapid exhaustion of many former sources of supply of constructional timber, leaves practically but two large areas available for future supplies, these are the yellow pine region of the South and the Pacific Northwest, and when I tell you that at a Convention of Lumber Manufacturers at St. Louis, which I attended last spring, it was stated by Mr. Long of Kansas City, a recognized authority on the subject, that the standing timber in the Southern states represented but fifteen years consumption, you may realize what the future value will be of the almost virgin forests of British Columbia. In my opening remarks I referred to the Lumber Manufacturers as destroyers of the forests, but Mr. President, there is one agency which yearly takes a greater toll than the Manufacturers, I refer to fire; each year we see large areas of timber destroyed, the ultimate value of which is certainly not realized by the public. I trust that the Forestry Association will, as one of their first and most important duties awaken public sentiment to the necessity of protecting the timber supply which we possess whilst preparing for the reproduction of our forests in the future.

## THE DOMINION FOREST RESERVES IN THE DRY BELT IN BRITISH COLUMBIA.

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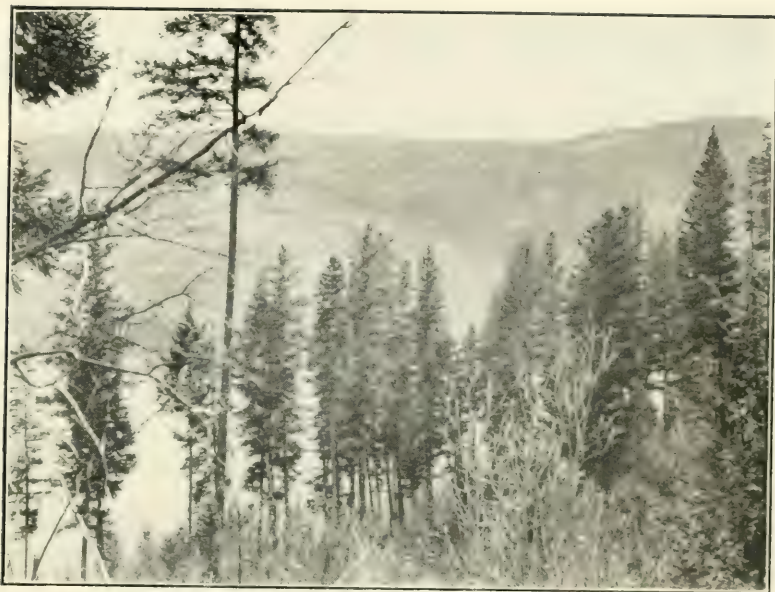
BY ROLAND D. CRAIG, F.E., INSPECTOR OF  
FOREST RESERVES.

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The Hat Creek, Tranquille, Long Lake, Niskonlith, Martin Mt., and Monte Hills Forest reserves, form a group which resemble each other in situation, purpose and silvicultural characteristics. Situated in what has been known as the "Dry Belt," but what should be called the "Irrigable Belt," the chief function of these reserves is to protect the watersheds from which flow the streams which are turning a land resembling the Majara Desert into a region of fruitful valleys. The great possibilities of these fertile valleys when watered, are just beginning to be appreciated, and anything which assists irrigation cannot easily be over-valued.

Heretofore the cattle industry has been the chief source of revenue to this district, but the large ranges required in this region of scant vegetation has made it not the most profitable business, and over-stocking has resulted in serious deterioration of the grazing possibilities. It has been demonstrated, however, that by irrigation \$300 to \$500 per acre per annum can be secured in fruit, and now settlers are pouring into the valleys with the intention of entering this profitable business. The profit and permanence of this industry is, however, directly dependent on the preservation of the forests on the mountains surrounding the valleys, for in the valleys there is very little precipitation, only 2 inches falling last year in Kamloops, and irrigation must be depended upon. At higher altitudes the precipitation, both in snow and rain, greatly increases, and if protected and controlled there is an ample supply of water for the land which is available for agriculture.

The value of a forest cover for catchment basins is often not fully appreciated. Dams and reservoirs may assist in controlling the run-off, but they are expensive and often unnecessary, and besides they do not protect the water from evaporation, which is one of the chief sources of loss. The forests not only retard the run-off, but prevent a large part of the loss by evaporation by excluding sun and wind. In that region too, where much of the water comes in the form of mists, which are blown along the mountain tops, the increased surface afforded by the forests arrests much of the moisture which would otherwise be lost. Persons travell-



Tranquills Forest Reserve, a source of water irrigation.



3-year old apple tree near Kamloops -the result of irrigation.





ing in a forest on a misty day will have noticed how the water drips from the leaves, while in the open very little reaches the ground. Observers will also have noticed the almost entire absence of perennial springs and small streams on bare mountain slopes, whereas wooded slopes of similar altitude and other conditions will be dotted with springs.

Kamloops valley, which lies in the midst of these reserves, has an altitude of 1600 feet, while the hills about rise to 6000 and 7000 feet. The valley and lower hills are almost treeless, except for the poplars, willows and alders which grow along the water's edge. At about 2000 feet open park-like stands of bull pine occur and increase in density with the altitude. At about 3000 feet a mixture of Douglas fir occurs with the pine and gradually replaces the pine as the altitude is increased. At 4000 feet black pine becomes prominent and between 5000 and 7000 feet forms the main stand with Douglas fir, Englemann's spruce, black and white poplar as secondary species. The supremacy of the black pine is undoubtedly due to the ability of the cones to protect the seeds from fire, and the density of the black pine reproduction following a fire makes it difficult for other species to compete with it. Most of the black pine stands are young and are evidently replacing the fir and spruce. The bull pine being more tolerant of drouth, succeeds over its competitors at lower altitudes. There is very little undergrowth in these forests and the ground is covered with needles.

Compared with the Coast these reserves do not contain the best quality of timber, but it will be useful for mining supplies and fuel and some for saw material. Very little cutting has yet been done on the area reserved. The quality of the timber is largely due to fires which seem to have run almost everywhere, and have injured to a greater or less extent, even those trees not actually destroyed. Many trees die after a fire, even though the bark is not burned, on account of the heat injuring the tender cambium layer under the bark. Ground-fires decrease the vegetable matter in the soil and remove the mulch of needles which protects the soil moisture, so that the vigor of the tree is decreased.

The chief causes of the fires have been the railway, cattlemen, prospectors, campers and Indians. During construction and since, many fires have been started along the C.P.R., which have destroyed the timber in the vicinity, but now the officials realize the injury to the road from the loss of freight and spoiling of the scenery caused by fires, and are endeavoring to prevent further devastations. Cattlemen are in the habit of burning the forests annually, in order to increase the grazing area and to improve the grass. This short-sighted practice has been very costly to the forest and irrigation interests and must be stopped.

Prospectors sometimes burn the forests in order to expose the underlying rock. Carelessness with camp fires has been the cause of some fires and the Indians are accused of setting fire to round up game and to improve the feeding ground for the deer.

There are still numbers of deer and some bear in these mountains, and in places there are beaver, which at the end of the closed season in 1910, will stand considerable exploitation. One of the finest trout lakes in British Columbia is in the Long Lake Reserve and many of the small lakes and streams in the district abound in Dolly Varden and Rainbow trout, attracting anglers from all parts of the world.

The area under reserves in this region should be considerably increased in order that the watersheds may be adequately protected, and then with a sufficiently large force of rangers to guard these reserves, they will be of inestimable value to the surrounding district.

#### FOREST RESERVES AND PUBLIC HEALTH.

With industrial development and its accompaniment of crowded cities and strenuous business applications, the need of mankind to return to the great out-of-doors for rest and health is increasing. Never before were the forests more appreciated for the invigorating life they afford than at present. Not many years ago people who would spend their holidays camping out in the wilderness would have been ridiculed. Now, however, thousands seek the sylvan solitudes in the summer, enduring many discomforts and often privations in order to get back as near as possible to the natural life. The forest reserves which are being established throughout Canada, will preserve for future generations these recreation grounds. In the fight against tuberculosis, the establishment of isolated sanatoria where the patients can enjoy an out-door life, is one of the chief means of combat. It would seem that the forest reserves, situated as they are away from settlement, should provide ideal sites for these sanatoria and that the Government should offer every encouragement for the use of the reserves for this purpose.

## A DAY'S WORK IN RIDING MOUNTAIN.

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BY H. CLAUGHTON-WALLIN, F.M., FOREST ASSISTANT, FORESTRY  
BRANCH.

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When approaching Gladstone, on the Canadian Northern Edmonton Line, the traveller will notice how the flat treeless prairie is gradually disappearing and being succeeded by a wooded country. As the train carries you further towards Dauphin, the trees increase in size and variety. There are among the poplars, scattered oak, elm, ash and Manitoba maple, and also here and there an old shaggy lopsided spruce, looking lonely, as if it was wondering why on earth it was left there to struggle for existence among so many strangers.

On your left you see a bluish wall a few miles distant following you for several hours. Coming from the east, with your head full of talk about the level prairies of Manitoba, you are surprised. Being a person fond of nature as it was before man tried to improve it, and having thoughts for something else than the prosaic "How to invest your spare money to the best advantage," your interest is aroused.

It is not that the scenery is in any way startling. Had it been, for example, in Quebec or British Columbia, you would never even bother to lift your eyes from your paper to look at that blue mountain wall. But it being situated in Manitoba your interest is, as was said before, awakened.

In your mind you see yourself there in the wilderness, following an old Indian bridle path through the beautiful forest, drinking the refreshing cold water from some little mountain stream and now and then getting a glimpse of a majestic moose or a graceful elk.

Well, those were the thoughts running through my mind, and the only thing to regret is that my fellow passengers on the Edmonton Express did not have the same good luck as I, to spend a whole summer up there in the Riding Mountain.

The writer had received instructions from the Forestry Branch of the Interior Department to proceed to the Riding Mountain to conduct a valuation survey on the Dominion Forest Reserve situated there, and at the end of May I arrived in Dauphin. To those of my readers to whom this name is not familiar, I may say that Dauphin is one of Manitoba's most progressive towns situated on the Canadian Northern line from Manitoba to Edmonton, twelve miles north of the boundary of the Riding

Mountain Timber Reserve. This town was to be our headquarters.

After all arrangements had been made about the "grub," and about the—for some of the fellows it looked just as necessary—mail, etc., the party started for the mountain, all expecting interesting work and a pleasant summer. If we were disappointed or not I will leave to the reader to decide after reading this article.

About twelve or fifteen years ago the timber reserve, consisting of about forty-three townships, was visited by immense forest fires devastating considerable areas. Where before had been valuable spruce timber the fire left it a wilderness. The grey tree stems stand there for a time till insects, fungi and storms have played their parts and felled them to the ground, where they in places form an almost impenetrable chaos—in truth a sorrowful sight! These fires were however, confined mostly to the western parts of the mountain, though the east was far from left intact. But still tracts of good forest are left in these eastern parts, and it was there the valuation survey was conducted last summer.

The first thing that caught my eye was the richness of vegetation. Following a winding trail up the mountain side you will find poplars, oak and ash, mingled with Manitoba maple, elm and birch. Coming higher up on the second plateau, white and black spruce, larch, poplars, birch and also balsam seem to gain ground and leave the other varieties behind. Jack pine is found in the southeastern part of the Reserve. There are in some of the valleys groves of Manitoba maple. When I first wandered into one of them I was surprised to find, at the foot of almost every tree, a basket shaped thing, made of a single piece of birch bark. On looking more closely I noticed in the trees a cut in which was placed a little piece of wood sloping downwards. Here is where the Indians come in the spring to tap the maples for sap of which they make syrup.

The undergrowth is quite dense, mostly consisting of hazel and mountain maple.

The scenery is very picturesque, deep ravines from the bottom of which you can hear the rushing of some rapid river or creek, beautiful little lakes lying there in the stillness of nature, the home for one or two families of the white-breasted northern diver, or a little colony of ducks, and serving, on a hot summer day, as a place of refuge from flies and mosquitos for the aristocrats of the forest, the proud moose and elk.

Now, may I ask you, my readers, to forget the worries of life and come and spend a few days in the camp of the forest survey party. It is the month of August and you will find our





Black and White Poplar in the Riding Mt. Forest Reserve.



tents pitched at Lake Audy. Well, early in the morning you will be suddenly disturbed in your slumber by a cheerful: "Get up here, six o'clock, weather is fine, not a cloud. Get a move on!" That is George, our cook, whose head never fails to appear in the tent door at this time, Sundays excepted. After a few minutes there is another call: "Ain't you up yet? Pancakes is getting cold." Everyone has a soft spot for George's pancakes. I believe he had to start to make them at five o'clock; so up you get, a dip in the lake, on with some clothes, and you are ready for the breakfast. At seven o'clock there is nothing left on the table except the hardware, and out we go to work; one party of four on a valuation survey, and another party to take stem analyses. Let us follow the former party. There are two men on the chain, the head man carrying a compass to maintain a straight course, the rear end man keeping the tally. The other two fellows go one on each side of the chain, calipering the trees to a distance of  $16\frac{1}{2}$  feet from same, calling out their variety, diameter  $4\frac{1}{2}$  feet from the ground, and how many logs they can get from each tree, to the tallyman, who puts it down on a printed form. On the back of this he makes note of everything that is particular to the stand he is going through, location, situation, soil, ground cover, undergrowth, variety of trees, density, silvicultural conditions of the stand, reproduction, etc. Insects and fungi are collected and damage they do is studied. These lines all run parallel at different distances depending on the type of the forest and how careful an estimation you wish to obtain.

But what is all this racket about? Oh, Dan, the teamster's dog, which is following the party, has got hold of a wolf. He bites and shakes it, but poor Dan's teeth are not very sharp and not much harm is done. Disgusted, he lets go his hold and quick as lightning the wolf has got him by the nose. There is a yelp and the wolf is caught in Dan's grip again. But the result is no better. This time, however, he is careful not to open his jaws and with the help of Gus, who is "found carrying concealed weapons," the poor wolf is passed into eternity.

And the surveying party continues its march, through good timber, over big brulés and muskegs, crossing rivers, wading through sloughs, tumbling down a deep ravine only to have to climb up again on the other side the next minute. But everyone is cheerful and if the sloughs become too deep there is always Parker's "It's a gay life, boys!" which means that you are not going to be a quitter.

Seven o'clock finds us all at supper table. The stem analysis party tell their experience, how they have been occupied finding out age and annual growth, height, merchantable length, etc., of different trees, and how they saw a big bull moose on a cutting biting off the tops of young trees, showing a most alarming dis-

regard for forestry; and fresh tracks of bear had been found on the trail just outside camp.

What is more pleasant than an evening in camp, especially on a lake full of fine pike? When too late for fishing there is always a vacant place for you at the camp fire. The pipes are lighted, good yarns are following each other, and for hours you sit there listening, till suddenly you find yourself alone. Throwing a piece of wood on the dying fire you manage in the upflaming light to look at your watch. Midnight! All the fellows in bed. And with lingering steps you go to follow their example. From the lake there comes the weird cry of the loon and back in the forest the wolves are howling.

Much more could be said about a forester's interesting work and his pleasures; about rainy days and millions of mosquitos. But what true woodsman would mind the latter when he knows that they are the evils of the early summer and that better days are coming?

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There are farmers in every section of the older provinces who regret their lack of foresight in the early days of settlement, when trees were cut down heedlessly and indiscriminately on their lands and burnt on the spot or sold as cordwood in the neighbouring towns leaving them, as many are to-day, with little or nothing to occupy them in the winter season, and without shelter for their live stock at a time when pasture in the old days was still accessible for weeks longer on the approach of cold weather than it has been of later years.

The influence of the forests of Canada upon the streams and lakes has long been a problem with our people. The floods at Montreal have cost the city hundreds of thousands of dollars besides interfering with business and affecting the health of the citizens. It has been well known for years that the almost sudden down-pour of water and cakes of ice in the spring, as compared with early days, was due to the denudation of the forests in the upper reaches which prevented the too rapid thawing of the ice and snows on the inland lakes and streams, the feeders of our great rivers. —*The Canadian Journal of Commerce.*



## TREE PLANTING AND NURSERY WORK AT INDIAN HEAD.

BY NORMAN M. ROSS.

The season now closing has been a most favorable one for general nursery and tree planting work. The crop of seedlings grown for distribution, though not quite so large as that raised last year, owing to a very dry spell of weather in August, which practically stopped all growth, is a very good one, the seedlings being particularly strong and vigorous. All the permanent plantations and belts have made wonderful growth, the new wood on the cottonwoods and willows averaging at least 4 feet—the maples not quite so much.

This year about 5 acres of permanent plantation was set out in native white spruce and Scotch pine; the former were raised from seed in our own nurseries and when planted were 4 years old, having been 2 years in the transplanting beds. The young plants were from eight inches to one foot in height and very strong and healthy. Of the Scotch pine 75% were grown at Indian Head and were 4-year transplants, 25% were imported from France as 3-year transplants. It will be interesting to notice which lot of plants come through the winter best. Up to the present date these evergreen plantations have done very well, on the whole not more than 15 to 18% of the young trees having died. As they are very slightly protected it is expected that a considerable number may not survive the winter should the snowfall be light. Last year about 500 Scotch pine from France were set out in mixture with native spruce and tamarac. The winter was not very favorable for young evergreens, as there was practically no snow cover. In early spring, owing to very severe winds and bright sun, many of the young trees were browned up and did not recover. However, 60% came through and have made a very good stocky growth this season. This winter, as the plantation has made considerable headway, much more snow will be held on the ground and very little loss should occur from winter killing.

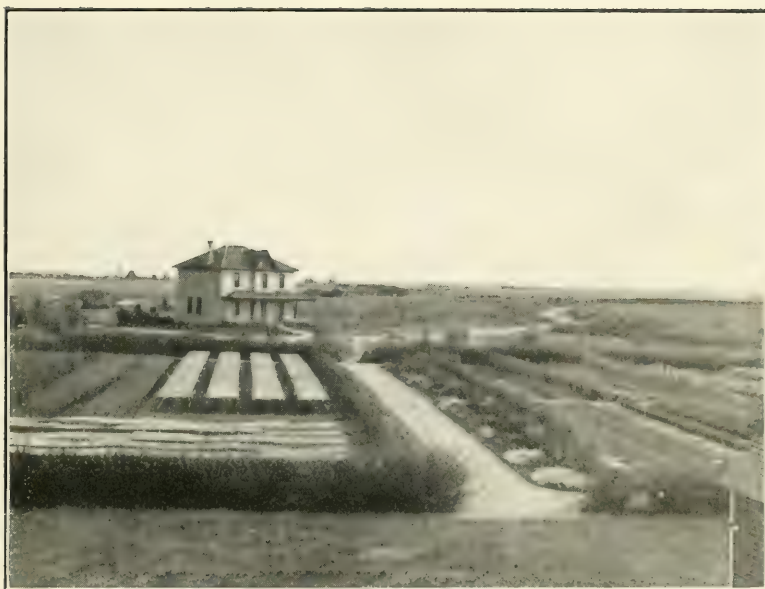
The native white spruce in the nursery, which were planted in spring of 1904 in mixture with native larch, are now well established, and this season many of the young trees made a growth of over two feet. The tamarac however, is evidently too strong for the spruce and will overgrow them completely in a year or so more. The growth that the tamarac has made is wonderful. When planted in 1904 the seedlings were not more

than 1½ feet high and about the diameter of a lead pencil or perhaps less. Several are now over 6 feet high. The growth is exceptionally strong and vigorous, the young trees measuring on the average at the ground about 1½ inches diameter. This plantation was set out on very rough backsetting, without the slightest protection of any kind. After transplanting not 1% died and there was no loss at all from winter killing. Those planted in 1905 were equally successful. From present indications this variety will become of great importance for prairie planting, owing to its hardiness, rapidity of growth and the many valuable uses to which the wood may be put.

It is unfortunate that up to the present we have not been able to secure any seed from the native larch. The seedlings are got from the natural swamps and therefore cannot be obtained very generally. However, it is hoped that we may be more fortunate in collecting seed in the future. The natural reproduction in places is so thick that very heavy seed years must occasionally occur.

The question of collecting seed is of considerable importance where trees must be raised in sufficient numbers to meet the demands of the present tree planting work. From 2½ to 3 million trees will be required annually from now on. This season, owing to late spring frosts, no maple or ash seed in any quantity can be found in Manitoba or Saskatchewan. In order to be safe in a poor seed year, we have always tried to keep at least a year's supply of seed on hand, unfortunately however, last season was also a very poor one for maple seed, and only enough could be obtained for this year's sowing, consequently great difficulty has been experienced in arranging for a supply for next spring. We have been fortunate enough in obtaining a sufficient quantity in North Dakota for our own use and possibly may have a little for distribution. In the past a considerable number of Dakota cottonwoods have been sent out. These are imported from North Dakota, where the seedlings are gathered on the sandbars of the large rivers. The people through whom our supply is obtained, state that owing to the cutting of the old seed trees along the river banks, seedlings are becoming scarcer year by year, and it is quite possible that in a few years we shall be forced to propagate this variety from cuttings. This, however, is a very expensive method and does not produce nearly as healthy stock.

The elm bore a fairly good crop of seed this summer and about 50 lbs. was collected. Three acres were sown in drills 30 inches apart and now show a very fair stand, which should result in the neighbourhood of 300,000 seedlings next fall. This is the first season since 1903 that we have been at all successful in securing seed of elm. It is a very desirable variety for planting



Forest Nursery Station, Indian Head.



Spruce and Larch planted 1904, at Forest Nursery Station.





in the west and it is unfortunate that the supply of seed should be so uncertain. In 1905, as no seed could be obtained in the west, a quantity was procured in the Eastern States. The stand produced during the first season was very good, but every seedling was killed during the winter, proving conclusively that the seed must be collected in this country. Some years ago we had a similar experience with the Manitoba maple. Owing to a scarcity of seed here, a quantity was purchased in Minnesota. The seedlings however did not mature and although not actually killed outright, were in such poor condition that we would not distribute them.

The fact that wood for fuel can be grown most profitably in this country is demonstrated more clearly every season. In some districts wood can be obtained from natural timber belts with little difficulty, but away from these restricted areas, the settlers are limited to the supply brought in on the railways, poplar wood of only average quality being worth \$6.50 per cord. There is not the least doubt in the mind of the writer as to the possibility of growing fairly good fuel within 6 to 8 years, when cottonwood or willow are used, and when the trees are properly set out and cared for. In the spring of 1903 we were using some land on the Experimental Farm at Indian Head for our nursery work and in order to obtain a quick shelter a few rows of cottonwoods were planted. The total length of the rows would be about 700 yards, the trees being set 30 inches apart and were about 1½ feet high. We are now giving up this land and consequently had to cut out these hedges, which in 4 years have made great growth. The trees average 15 feet high and many are over 6 inches in diameter at the ground. We have now cut up and piled over 3½ cords of wood cut from these hedges. This wood is not of course best quality, though it is just as good as hundreds of settlers get after travelling to the bluffs in the winter and probably taking three days for the round trip. At the present time growing trees for profit on the prairies has not received any general consideration, but before many years it is hoped that every farmer may devote a few acres to this purpose.

At the nursery station it is intended to establish several large plantations, which will be sample plots to test the value of the different hardy varieties planted in mixture and pure stand and at different distances apart. As a considerable area of land will be necessary for this purpose, an additional ¼ section adjoining the one already under cultivation has been reserved for the work. At present the land is unbroken. Fifty to sixty acres will be ploughed and backset next season; part of this may be planted the following spring, but most will be put into oats, after which the land will be summer fallowed and got into a better condition for planting.

Throughout the country general interest in tree planting is rapidly increasing. Applications from settlers wishing to avail themselves of the Government distribution are being received daily. The tree planting inspectors report that the plantations are set out and cared for in a more intelligent manner than formerly, and particularly it is noticed that more care is given to the preparation of the ground.

It is encouraging to note that the C.P.R. are undertaking the planting of trees for snow breaks along their tracks and are also about to experiment in the growing of wood for ties and posts. It is to be hoped that the first plantings will prove successful and that this line of work may be more extensively carried on.

#### DESTRUCTION OF PINES NEAR BANFF.

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During the fall of 1905, I noticed a stretch of timber with all the appearance of having been burnt over—this was while coming back from a day's work on Sulphur Mountain. I had no reason to believe that it had been burnt over, as no forest fire had been in the neighborhood, to my knowledge. The matter having been brought to my attention by another observer, I resolved to visit the locality when opportunity afforded.

About a year went by before I had an opportunity of examining into the cause for such a phenomenon. On September 5th last, in the morning, I walked to Rundle Mountain—the locality—arriving at my destination within 2 hours, and took the following notes of the surroundings: About 1000 feet above the Spray River (possibly more above the town), and 5500 feet or so above sea level, I found from 1 to 2 miles or thereabouts of dead or nearly dead pines (*Pinus Murrayana*), that is from the appearance of the leaves. These ran from E.S.E. to W., the width about 600 ft., or more in places. The leaves on the trees were yellow, many having been blown to, or fallen on, the ground, the tops were green as a rule, the dying leaves only covering part of, and seldom the end of, the branch.

These trees are in what might be called rather open woods and run up to a rocky ledge; above this a few yards on, are spruces which remain uninjured; below, there is a continuation of pine (*Pinus Murrayana*), growing more densely and much smaller in size, gradually merging from trees whose top only was scorched with those uninjured. The bark was in no way injured, but

dead leaves ran up the trunks and on others these had fallen off branches growing closely to the ground on a fairly gradual slope. A few balsam poplars (*Populus balsamifera*) were dead, about the margins of dried rivulets. Some spruces (species uncertain) held dead or partly dead leaves. Gravel, loose rock, and earth formed a soil which was overgrown by grass, bearberry (*Arctostaphylos Uva-ursi*), etc.

I was careful in going over the ground to look for insects or disease, but an examination of a number of trees gave me no reason to suspect that either of these had affected the trees. As the meteorological conditions during the last two years may have caused the conditions described above, especially the amount of moisture precipitated, the following data are submitted:

The snowfall from January to October, inclusive, was for:—

1902	1903	1904	1905
97.45 in.	78.83 in.	50.14 in.	21.25 in.

The rainfall was for:—

1902	1903	1904	1905
20.96 in.	16.04 in.	7.89 in.	13.18 in.

The snow on the mountain slope would possibly be more than in the valley.

As to the temperature for October.

The lowest recorded was 3.3 on the 18th October, 1905, with about 2 inches of snow in the open valley; the lowest previously recorded, occurred on the 31st of October, 1893, with about 8 inches of snow in the open valley.

The snow on the ground for October 1904 was on the 7th, 0.65 in. with practically none to the 20th November, when 5.25 in. fell, and from 5 inches to 1.75 in. to end of November. For December practically none to the 16th, then 5 to 8 in. to the end of month. October 1905, no snow on the ground till the 17th, then 2.45 in., from the 20th practically none till the 26th November, when 2 in.

The snowfall for 1905 was exceptionally light. Precipitation below the average for 1904 and 1905.

I therefore attribute the dying of these trees to the low temperature coming rather suddenly, and earlier than usual, after comparatively mild weather, with perhaps insufficient moisture and winter protection, as a secondary cause. I would ask what is the opinion of others.

N. B. SANSON, Curator,  
Rocky Mountains Park Museum,  
Banff, Alberta.

## VIEWS OF A DISTINGUISHED FORESTER.

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Sir Dietrich Brandis, the father of the present system of Forestry in India, in a letter to Mr. E. Stewart, Dominion Superintendent of Forestry, makes some valuable suggestions. He says:

“I cannot sufficiently urge upon you the necessity of concentrating all your energies upon one point, that is the constitution of as large an area of State Forests as possible, to enable Canada (I mean the Dominion) to supply the greater portion of the coniferous timber now imported into Great Britain, permanently.

The timber now imported into Great Britain annually amounts to over nine million tons, valued at £24,000,000; and the greater part of this is coniferous timber. Of this quantity

Sweden and Norway supply.....	5	million tons.
Russia supplies.....	2	“ “
Dominion of Canada supplies.....	2	“ “

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9 “ “

Russia, as soon as the present troubles have been overcome, will develop its trade and industries in a manner not anticipated at present, and the result will be that they will consume all the timber this country can produce. Germany formerly was a timber exporting country and it now imports five million tons a year. And this, though the area of productive forests has been steadily increasing, and the annual yield per acre is now much larger than it was thirty years ago.

Sweden and Norway, tempted by the high prices and the ready market in England, are cutting more than what their forests annually produce. At the same time industry and manufactures are increasing, and the result will be, that that source also will come to an end.

The United States export very little to England now, and the Dominion of Canada is the only country from which, if the forests are properly managed, a permanent supply of coniferous timber for Great Britain can be expected.

All this means that prices will rise steadily, and it is for you in Canada now to seize this opportunity and to lay the foundation for a magnificent future development of your wealth.

Hence it is necessary that you should form as large an area as possible of State forests, and that you should place them under efficient, systematic management so as to secure ample regeneration of the species you want, either naturally or by planting.



I hope you will not establish a Forest School before you have forests under systematic management where your students can learn what is wanted. You will, of course, require a number of Forest Officers. Government forest management in India on a large scale, did not commence until in 1866 I obtained sanction to select two first rate German foresters, Schleich and Ribbentrop, who both were my successors, and to organize the professional training of young Englishmen for the Indian Forest Service in Germany and France, one of whom (the late Mr. Hill) was my third successor.

The United States would have done well, had they followed this example. But my young friend and pupil, Gifford Pinchot, thought that for political reasons it was necessary to proclaim the principle: "The American forests for the Americans." He and the small number of those who have received their professional training in the forests of France, Germany and Switzerland under my guidance are doubtless doing their best to bring the enormous area of forest reserves into working order, but in my opinion they would have done well had they strengthened their hand by the introduction of a limited number of men from Germany, of Dr. Schenck's knowledge and experience.

I doubt whether your hand will be free to act in this matter, and I will not therefore, in any way urge suggestions that may not be practicable. Fortunately the Forest School under Mr. Graves at Yale College and the Biltmore Forest School are, I understand, so far advanced that you can get men from these sources for your work. And you can wait until more of your forests are in proper working order before you establish a forest school of your own.

As soon as you have a suitable area of State forest entirely at your disposal, then place the most competent man you can get, and let him commence the management of that estate. The first operation will be to divide the area into compartments: in hilly country following the configuration of the soil; on level ground with uniform soil and other conditions, rectangular areas with due regard to river roads and other natural features. The Forest Ranger in charge is not master of the position unless he has divided his range into compartments.

When one forest range has been brought into working order then you will have to select from among the assistants whom you should at the outset give to each forest ranger, the most competent to take charge of a second range and so on, until gradually a good system of work has been introduced in the whole of your State forests.

By all means arrange for the exploration of your northern wilderness region, for the reservation of lands from settlement at the sources of your great rivers and for tree planting on the

plains. But your first work must be, to place those forests in working order which yield the timber used in your country and exported abroad.

At the outset this, as all similar operations, will entail expense, which you will I hope, be able to get Parliament to sanction. But after a few years, the revenue from these forests will far exceed the annual outlay, and then you will be independent, and can think of other branches of your business. Your aim should be, to make yourself financially independent as soon as possible.

In the teak forests in Burma, I commenced work in January, 1856, and in 1860 I was so far as to make a good annual surplus, and to sell at my Rangoon timber depot, timber of the first quality. Then, however, the timber merchants at Rangoon, who at first had looked with contempt upon my operations, demanded that the forests should be made over to them, and with the help of their friends, the powerful firms at Calcutta, they induced the Government of India to send orders to Rangoon (February, 1861), to throw open the forests to private enterprises.

Your Government will, I trust, be more far-sighted when the time comes, and I have no doubt they will be glad to have the revenue which your forests will produce, and which, under good management, will eventually become very large.

You will naturally ask: Why is not the coniferous timber which Great Britain imports, produced in this country? The reply is, that the land is nearly all private property, and as a rule the great proprietors are too rich to feel the necessity of increasing their incomes by making their forests pay. There is an immense deal of talking and writing regarding the necessity of planting up the waste lands, and managing the existing woodlands to greater advantage. In my younger days I have talked and worked in this direction, and since Dr. Schlick has taken charge of the Cooper Hill Forest School in 1885, he has been indefatigable in writing and speaking publicly. I have purposely kept in the background during this time, as it was better that the movement should be in one hand, and as Dr. Schlick had thrown himself into it heart and soul."

## THE MACKENZIE BASIN.

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Mr. E. Stewart, Superintendent of Forestry, is now preparing a report for publication of his visit during the past summer down the Mackenzie River and as far as the delta of that stream. In returning he crossed the mountains with Indians to the Porcupine River which he followed to its junction with the Yukon at Fort Yukon where he got a steamer south to Dawson, coming from there to Vancouver by the usual route via Skagway. About three months were spent on the trip and the distance covered from Edmonton to Vancouver was upwards of 4000 miles.

Mr. Stewart's main object was to gain a knowledge of the timber in the basin of the great Mackenzie River, but he also took note of the general character of the country and its natural resources, as far as a hurried journey would permit.

The area drained by this stream, including its tributaries, many of which, such as the Athabasca, Peace and Liard, are themselves great rivers, is greater than that drained by the St. Lawrence above Montreal, including the Great Lakes, and nearly three times that of the Saskatchewan.

From Athabasca Landing to Fort McPherson, a distance of 1854 miles was made by water, first down the Athabasca to Lake Athabasca; across a bay of that lake; then down the Great Slave River and across Great Slave Lake; then down the Mackenzie proper, nearly a thousand miles to the delta; then a short distance up the Peel River to Fort McPherson, which lies well within the Arctic Circle and is the most northerly of all the Hudson Bay Company's posts.

It is not possible here to give details of this interesting trip, but members of the Forestry Association will be supplied with copies of the report now in course of preparation as soon as it is issued.

Mr. Stewart says, among other things which greatly impressed him, was that the general character of the land, on the route from Athabasca Landing to Fort McPherson, is that of a rich, alluvial deposit, similar in appearance to that of our great prairies. Vegetable gardens were found at the different posts, as far north as Fort Good Hope, which is within twenty-five miles of the Arctic Circle. Another point was that he was never at any time beyond the limit of tree growth. Even at Fort McPherson, in latitude  $67^{\circ} 26'$ , the houses are built of spruce timber cut nearby, while the lumber for general use in flooring, sheeting, etc., is whip-sawed into lumber from logs, some of which were a foot in

diameter. There was also a vast quantity of spruce observed along the route, which is rather too small for lumber, but would furnish a world's supply of pulpwood.

The driftwood carried down to the Slave and Mackenzie rivers by such streams as the Peace and the Liard, is conclusive evidence that there is large timber up these rivers.

The fish in these northern waters, especially in Athabasca and Great Slave lakes, are of excellent quality and will some day be of great value.

The weather during the latter part of June and the beginning of July was exceedingly hot, and with the almost constant sunshine, vegetation was forced with hot-house rapidity.

The general conclusion arrived at, was that this country, both in climate and soil, is quite equal to northern Europe, and that when the more southerly lands are appropriated settlers will find comfortable homes in portions of the Mackenzie watershed that are now generally regarded as unfit for settlement.

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## SPRUCE INJURED BY FUNGUS NORTHWEST OF LAKE WINNIPEG.

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In making a geological exploration of the country between the lower Saskatchewan and Churchill rivers during the past summer, the white spruce, over a tract of forested land between Lat.  $54^{\circ} 45'$  and Lat.  $55^{\circ} 30'$ , and extending to about half a degree east and west of Long.  $100^{\circ}$ , were found to be all more or less withered and yellow, as though a fire had run through the moss covering their roots. Closer examination shewed that the damage was caused by a cup-shaped fungus growing on the leaves. Specimens of this were collected and submitted to Professor John Macoun, who was able to identify it as a species of *Peridermium*, a fungus attacking all the spruces.

Ascending the Burntwood River, a tributary of the Nelson River from the west, the spruces were first found to be affected on July 23rd, at a point on the river a few miles below Burntwood Lake, where the tips of the branches, the growth of this year, were quite yellow, and where the surface of the water was covered with a bright red powder, made up of the spores of the fungi that were shaken off in clouds by every breeze.





Spruce along the Athabasca River, 300 miles north of Edmonton.



Ramparts of the MacKenzie, above Ft. Good Hope.



A little further west, on Burntwood Lake, and southerly up the File River, the damage was more striking, whole trees, instead of only the tips of branches, standing yellow and apparently dead, the boughs wreathed with cobwebs.

Along the Grassy River, another tributary of the Nelson, about sixty miles south of the Burntwood, the trees were affected in like manner to a point a little east of Wekusko Lake. It was noticed that on points projecting from the north shore of the lake, trees on the east side were quite yellow, while those on the west side were only tipped, and generally the more exposed sides of the trees everywhere were most affected.

Throughout the whole region, white spruces alone were attacked, though black spruces are common, and often grow in close association with the white. A small branch, with the fungi, was sent by Prof. Macoun to Prof. Geo. F. Atkinson of Cornell University, who writes:

"It is *Peridermium decolorans* Pk., 27th Rept. N.Y. State Mus. Nat. Hist., 104, 1875. This has a wide distribution in alpine regions and northern North America. It occurs on *Picea Mariana*, *rubra*, *Engelmannii*, *Sitchensis* and *Canadensis*, the latter one being the white spruce.

Here it occurs along the mountains of the Pacific from Banff, British Columbia, into Alaska. Probably the reason it does not occur on the black spruce, is because this form on the white spruce may be a biological or physiological form. You will find an account of its distribution on pages 428 and 429 of the August, 1906, number of the Bulletin of the Torrey Botanical Club."

The attack of this fungus, though probably only in extreme cases resulting in the death of the tree affected, must retard its growth, and, if recurring year after year, to a very marked degree.

There are specimens in the herbarium of the Geological Survey, collected by Prof. Macoun in 1881 near Lake Manitoba, but no serious injury to spruce trees in that region has been reported.

WILLIAM McINNES.

Geol. Survey, Ottawa, Canada.

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The Annual Meeting of the American Forestry Association will be held in Washington on Wednesday, January 9th, 1907. Reduced rates on all railways have been secured for members and friends. Programmes, full particulars as to rates, etc., and other information may be had from the Secretary of the Association.

NOTES.

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The National Lumber Manufacturers' Association of the United States has undertaken to raise an endowment fund of \$150,000 for a chair of practical lumbering at the Yale Forest School. The work will be under the direction of a committee of lumbermen until the full amount of the fund has been raised, and no professor of lumbering will be appointed until the full amount of the endowment has been collected. In the meantime lectures and class work will be conducted by practical lumbermen from different parts of the country and in addition to these special lectures, instruction will be given at New Haven in the economics of the lumber industry in the nation, its position in commerce, industries dependent upon it, cost of logging, and in fact on all branches of the lumber industry.

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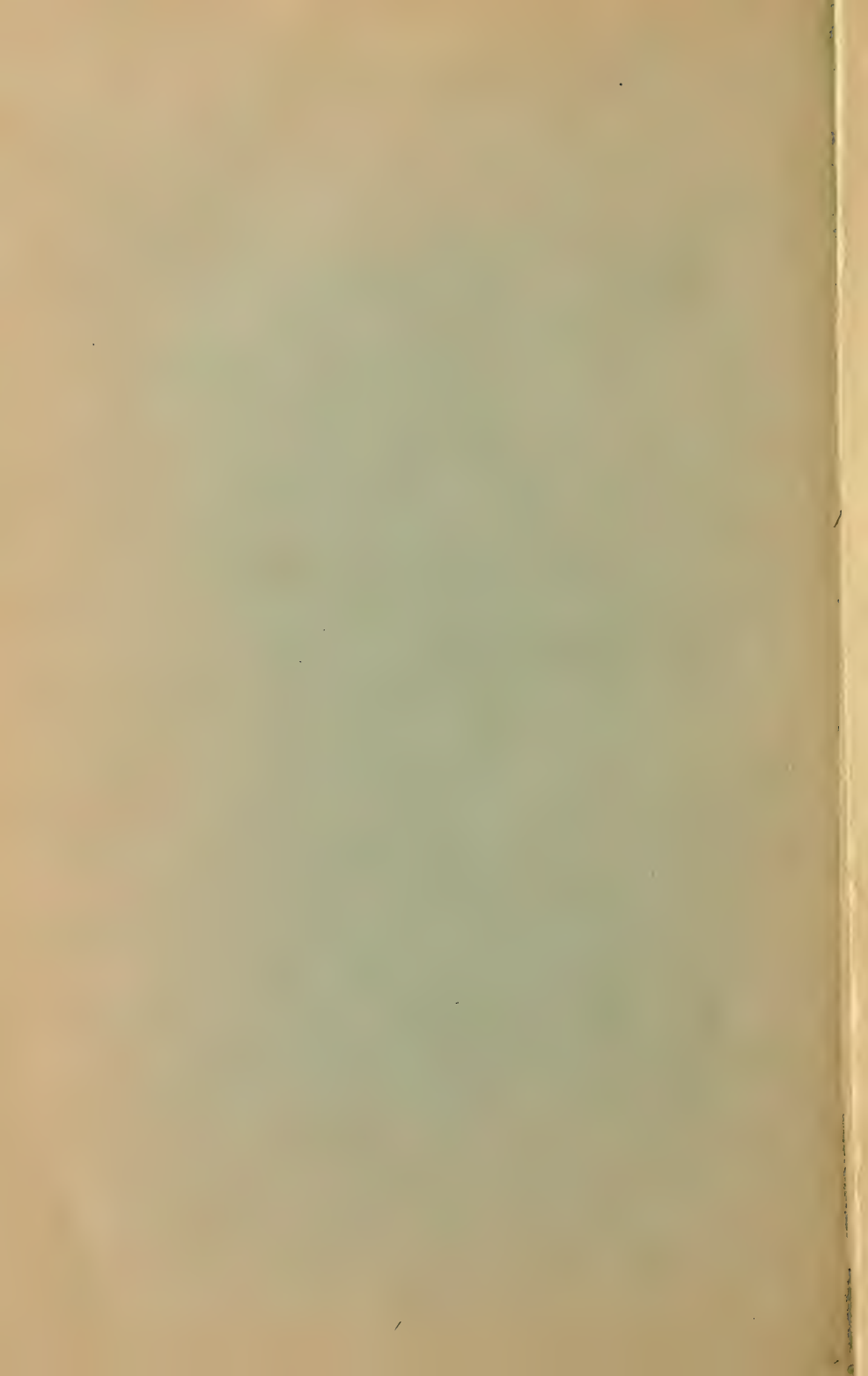
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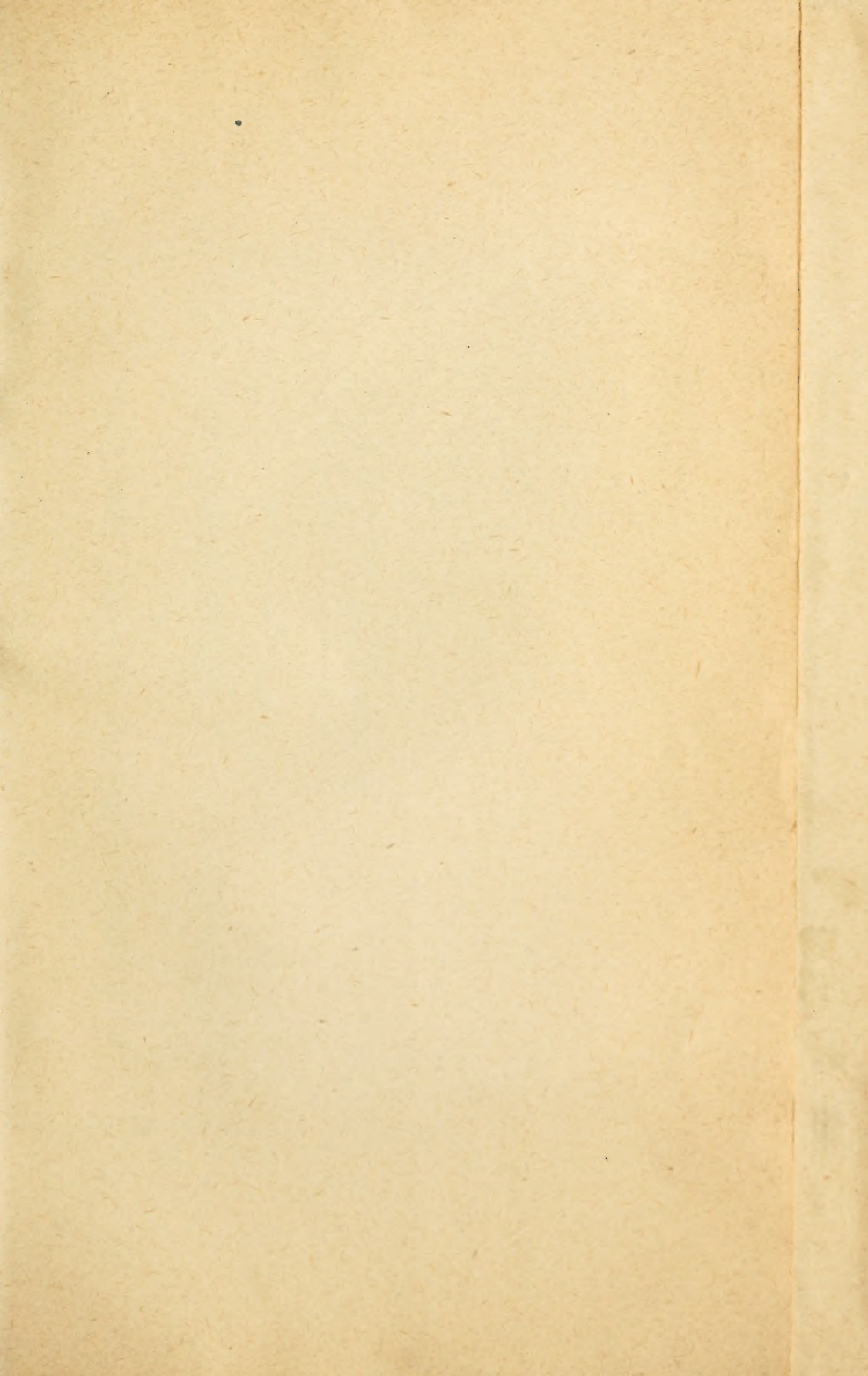
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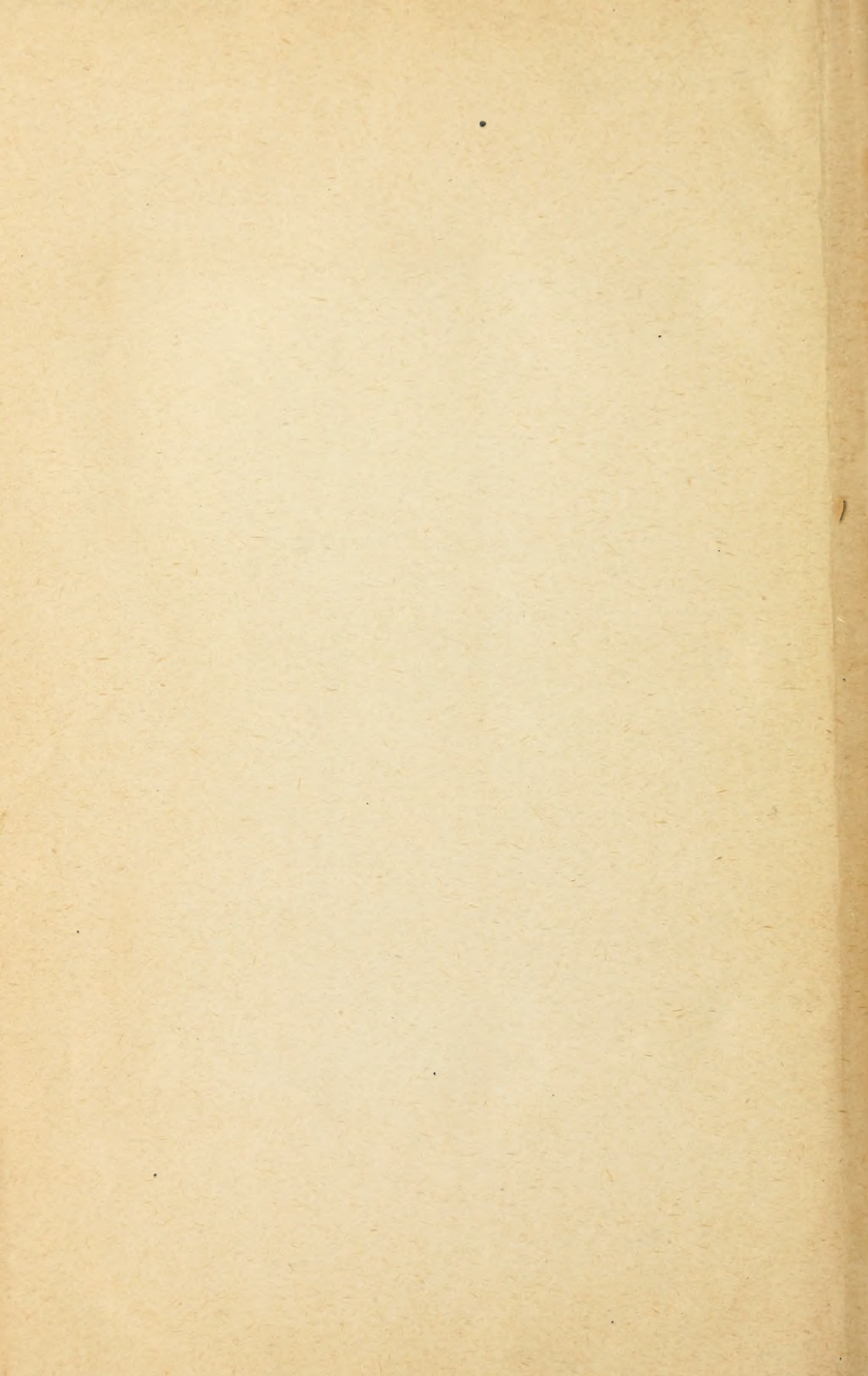
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